THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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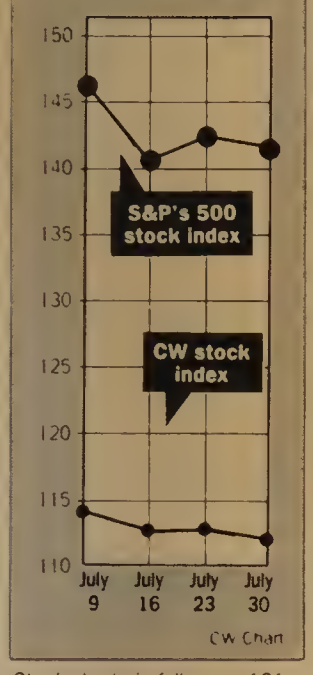

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U.S. and Japan settle chip trade dispute. **Page 99.**

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DEC 1986 earnings come in 38% higher than last year's. **Page 102.**

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Compaq Computer is now favored to win the pole position in the 386 microprocessor sweepstakes, with a reported Sept. 9 introduction of a 32-bit system based on Intel's 80386 chip. Compaq is one of more than three dozen vendors currently jockeying to get off the mark with a 386 machine in 1986.

■

In another key 386 development, several expert system software vendors have disclosed plans to port their LISP and Prolog versions to the 80386 microprocessor. Intel is hoping the announcements will boost implementation of its touted chip by bringing high-speed artificial intelligence processing capabilities to

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Users slow to adopt Disoss

Ease-of-use features, peer communications lacking

By Elisabeth Horwitt

Most recent releases of Distributed Office Support System connectivity products from IBM and minicomputer vendors are still faulted by users for lacking critical peer-to-peer communications and ease-of-use features. These shortcomings have made users wary of adopting the document distribution software as the common communications system in multivendor environments.

The following items provide evidence of this development:

• Of 70 Fortune 1,000 companies recently surveyed by computer management consulting firm Forrester Research, Inc. in Cambridge, Mass., only 21.7% have already installed Disoss. Another 7.2% said they will install Disoss within the next six months, while 4.3% said they had already tried Disoss and thrown it out.

• IBM has withdrawn active support for 8100 and 5520 departmental processors, the systems Disoss was originally designed to connect, in an apparent effort to have users move instead to System/36 installations.

• Wang Laboratories, Inc. reports that there are currently fewer than two dozen production-environment implementations of its Disoss product.

"Disoss is really only viable over the long term as a common denominator to make Digital Equipment Corp., Data General Corp., Wang and IBM systems talk," says Jean Hazelwood, senior product manager for IBM Integration Products at Lowell, Mass.-based Wang. "Right now, Disoss is difficult to install, its performance is not great and implementation usually requires a system upgrade. IBM is only gradually filling these holes."

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DG boosts low-end line, price of CEO

By James Connolly

WESTBORO, Mass. — Employing the proprietary microprocessor nicknamed Micro-Eagle for the first time, Data General Corp. last week announced a low-end minicomputer that it will pit against the IBM System/36 and the Digital Equipment Corp. VAX 8200.

But while boosting the performance figures for the low end of its product line with the MV/7800, DG also announced price hikes for almost half of its product line. The increases averaged 10% for software such as DG's Comprehensive Electronic Office and 6% for hardware.

The newest DG hardware products, such as the MV/20000 superminicomputer

See **DG** page 4

Tandy clones target big firms

By Alan Alper

NEW YORK — Retail giant Tandy Corp. last week took the latest step in its multipronged strategy to broaden its corporate customer base, introducing three aggressively priced IBM Personal Computer-compatible systems. Tandy also recently expanded its corporate sales force by 40% and began offering volume discounts that, at the low end, exceed those of IBM.

MIS departments at large corporations are seeking products with more functionality at costs lower than IBM's, Tandy Chairman John Roach said at a press conference last week. "Companies with

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CW SPECIAL REPORT

Centrex deals: Users find PBX threats, pressure produce bargains

By Elisabeth Horwitt and Stanley Gibson

Large corporate communications users are discovering that the time is riper than ever for wringing major cost-saving concessions from local telephone companies. By threatening to switch to private branch exchange systems, these users are resorting to something very like blackmail in order to force the divested local Bell operating companies to offer them attractive special Centrex deals.

The local carriers, rather than risk losing university and business customers with installed bases of 10,000 or more telephone lines, have demonstrated their willingness to absorb access charges, hold off on rate hikes and even install digital switches to order.

Industry experts caution MIS and telecommunications managers not to delay too long before nailing down favorable terms with their carriers — preferably for deals lasting for an extended period such as the next five years. Today's good deals on Centrex rates and access charges may soon fall victim to regulatory pressure from the North American Telecommunications Association, a customer premise equipment vendor organization.

Blackwell

There are technical as well as financial reasons for MIS putting the squeeze on local telephone companies. Sometimes threats are the only means by which customers can obtain the local telecommunications services they need, since switch technology and service options vary greatly from one central office to another, notes John Powers, vice-president of strategic services at Dedham, Mass., consulting company Telecommunications Management Corp. "There are a lot of analog Centrexes still out there, and they just can't provide the same level of goodies available on a digital switch," Powers says. He predicts by 1995, approximately

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Lotus upgrade's compatibility lessens users' Release 2 anger

Release 2.01 of 1-2-3 targets 'critical issues'

By Douglas Barney

CAMBRIDGE, Mass. — User reaction to Release 2.01 of Lotus Development Corp.'s 1-2-3 has been generally positive, according to an informal survey by *Computerworld* last week.

The new release was designed to cool user anger aroused a year ago, when Lotus's Release 2 of 1-2-3 was found to be incompatible with the original version in some areas.

Despite Release 2's enhanced macro capabilities and its capacity to build larger spreadsheets, the compatibility problems prompted many users to hold back on upgrading. "Our response was not to upgrade wholeheartedly. Our tax department, however, had a number of very big spreadsheets, and we needed the extra memory management," said Greg Allman, a senior consultant for Deloitte Haskins & Sells, a New York-based accounting firm.

Lotus does not now guarantee total compatibility between Release 2.01 and the original release, but a company spokesman said the newer release was a major improvement. "There is no claim here that what we have achieved is 100% compatibility," said Janet Logan, a Lotus spokeswoman. "We did extensive research on Release 2 and evaluated all of the feedback, and we think that 2.01 reflects the most important and the most critical issues."

Resentment lingers

Although users praised Lotus's efforts to correct the incompatibilities, many still resent the problems they faced in upgrading. "Under Lotus's 1-2-3 Release 2, there is additional information stored with the data in a work sheet file. When you run Release 2, it can read a file created under Release 1A into memory, but when you go to save the file, a message goes up on the screen saying, 'You are about to save this file as a WK1 file, rather than as a WKS file,' " said Michael Selva, PC Coordinator for Spaulding Hospital in Boston. "I just wish they had kept the same file structure."

The key to the greater compatibility of Lotus's "maintenance release," which costs users $15, is having labels in work sheets equal zero when used in a mixed formula reference. "That is mainly an issue when people are using Lotus as a data base, where you need to do a day-to-day count or an average of some objects that are in a column or a row. If those objects are character strings, then you are going to run into problems," Selva said. "If people had developed very elaborate macros using the old Lotus, some of those macros would crash."

Program's speed

Another problem with Release 2 was the program's speed. "Large spreadsheets take longer to retrieve in Lotus Release 2 than they did in 1A, which made no sense. A spreadsheet that would take five minutes to load from 1A would now take from 15 to 20 minutes in Release 2. That was our major problem," said Bill Caulfield, information center analyst with Eaton Corp. Lotus claims to have addressed that problem with the newest release.

Another problem was created because Release 2 needs an extra 84K bytes of random-access memory (RAM) compared with Release 1A. Applications written for 1-2-3 that require nearly 640K bytes of RAM now need an expanded memory device that allows users to access more than 640K bytes, said Van Barletta, manager of tax computer services for Arthur Andersen & Co. in New York.

For some, this is not a major problem. "I've been steering people away from doing huge, huge applications in Lotus," Selva said.

Nor is it a major problem for Arthur Andersen, which had held back on upgrading to Release 2 because of its compatibility problems and will now upgrade to Release 2.01, according to Barletta. Arthur Andersen was one of the most vocal critics of Release 2. More than 1,000 packages will now be upgraded.

"I think we are well pleased with what it fixes," said Danielle Barr, vice-president of corporate systems for the Bank of New England Corp. in Boston. Release 2.01 loads faster, installs more easily and no longer requires a key disk, according to Bill Jennings, office systems analyst, who is evaluating the product for the Bank of New England. "This release contains some smaller improvements that I am sure were to fix some errors in the huge change from Release 1A to Release 2," Eaton's Caulfield said.

Although Lotus is charging $15 for the release, large-volume buyers may receive the product free. "We would probably have to distribute them here, but they would supply them to us for free. That is my best guess," Deloitte's Allman said.

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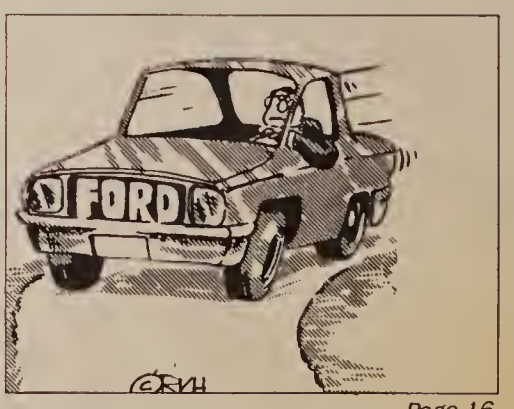

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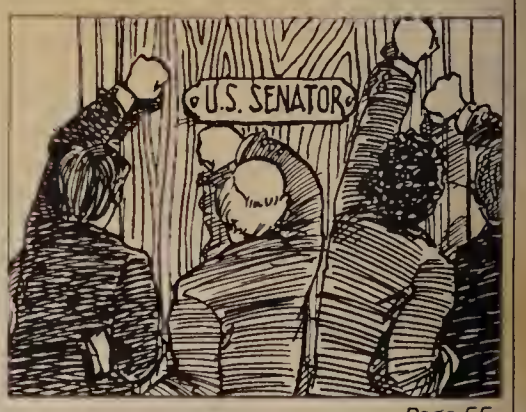

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Tandem broadens low end with two EXTs

Machines offer more power, expandability

By Jeffry Beeler

CUPERTINO, Calif. — Tandem Computers, Inc. last week prematurely retired its Nonstop EXT on-line transaction processing system less than 18 months after its introduction. Tandem replaced the EXT with two upgrades, the EXT10 and EXT25, that address the original system's growth and performance shortcomings and broaden the low end of Tandem's product line.

The new systems, targeted at companies seeking to decentralize on-line transaction processing activities, reportedly offer customers price and performance improvements. Both new systems are reputed to run the same operating system and applications as the EXT, but they differ sharply from their predecessor in price and raw computing power.

The EXT10 and EXT25 form the centerpiece of a product announcement that also includes the following two elements:

- The Model 6150 communications controller, which on one board integrates three kinds of device support that with the original EXT required three boards.
- The Model 6526 terminal, which costs roughly 50% less than Tandem's existing Model 6530 display unit and offers basically the same functions.

Although the EXT10 and EXT25 are reputed to run exactly the same operating system and applications as the processor they supplant, the two machines differ sharply from their predecessor in price and raw computing power. Capable of executing 4.3 transactions per second, a basic EXT10 provides roughly the same computing power as a comparable EXT but costs about 30% less, according to Terry Retford, Tandem's manager of processor and memory products.

Out-performs EXT

With its 11 transaction/sec. throughput rating, by contrast, an entry-level EXT25 out-performs a minimally configured EXT by a factor of 2.5 and is priced proportionally higher, Retford said.

The EXT25 owes its performance edge over the EXT10 to its superior machine cycle time and to its use of a 64K-byte cache memory, which the smaller processor lacks, he added. Compared with the EXT10, which executes a machine cycle every 100 nsec, the EXT25 is rated at 83.3 nsec.

With a footprint of 8.3 square feet, coupled with the machines' ability to operate outside a computer room, the EXT10 and EXT25 are targeted at the remote locations of large corporations, according to Retford.

Tandem's first effort to crack the distributed processing arena began in April 1985, when the company announced its original EXT. But the processor's limited expandability created more user resistance to the EXT than its manufacturer apparently expected, according to Omri Serlin, head of Mountain View, Calif.-based Itom International, Inc., which tracks the on-line transaction processor marketplace.

"For some of our clients, the concern with the existing EXT was that it was a closed-end system," said a product manager for a beta-test user that develops funds-transfer software for banks. "If our customers acquired other banks or if their volumes grew significantly, they could easily outgrow their systems."

Even the smaller EXT10 affords an upgrade path for the existing EXT. "Thus far, our EXT10 has operated even faster than we had initially expected," the source at the beta-test site said.

In addition to relieving the EXT family's horsepower restrictions, the announcement also lowers Tandem's entry-level price barrier. "With the EXT10, Tandem is trying to extend its product line so that its

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DG boosts its low-end line

From page 1

and the MV/2000DC minicomputer, are unaffected by the hikes. The price of the older MV/10000 rose almost 22% to $167,100, where it stood before prices were slashed in conjunction with the MV/20000 announcement last fall.

The MV/7800 is based on the custom very large-scale integration (VLSI)-based Micro-Eagle, which was developed in DG's Sunnyvale, Calif., facilities and provides minicomputer CPU functions in a six-chip set. The MV/7800 is positioned above the MV/2000DC.

The MV/7800 supports 25% more office automation users and provides a performance increase of greater than 50% at two-thirds the price of the 2-year-old MV/4000, according to DG. The MV/4000 remains available.

DG credited the Micro-Eagle chip with the performance boosts. The system has a machine cycle time of 320 nsec, which is slower than both the MV/2000DC and the MV/4000.

However, Bill Duckett, DG manager of integrated systems, said the overall system performance is faster than that of the other machines. "When you do custom VLSI, you can do little things like putting bits of memory right on the CPU chip," Duckett said.

"Compared to systems from IBM, our MV/7800 offers 32-bit performance at the same price as the less powerful 16-bit System/36 Model 5360. Compared to systems from Digital, the MV/7800 supports more office automation users than the VAX 8200 at a lower cost of ownership," claimed Frank Pinto, director of DG's Marketing Support Division.

DG officials said the MV/7800 supports 50 users in a typical office automation environment running clerical tasks, professional support, word processing and spreadsheets. They said the system handles slightly more than one million single-precisions Whetstone instructions per second. The MV/4000 supports about 40 OA users, according to the company.

The MV/7800 is available in three configurations: a commercial version costs $27,500 with 4M bytes of memory; a rack-mount version costs $19,050; and an upgrade version costs $10,000 to $17,500, depending on the model being upgraded. Monthly maintenance for the commercial system costs $120.

The system supports up to 14M bytes of memory, 14 I/O slots, 9.4G bytes of disk storage and 128 terminals and printers.

Explaining the price increases for the MV/10000, MV/8000 II and other products, a company spokesman said these are a restoration of cuts made when DG announced the MV/20000 and wanted to maintain sales levels for the older systems.

Analyst George Colony, president of Forrester Research, Inc., said the price hikes may not hurt DG.

"They probably are doing it because DEC has been getting away with some fairly high prices. DG probably is still going to have an advantage of about 7% because it has been sticking to cut-to-the-bone prices," Colony said. He noted that price is one of DG's prime competitive weapons, and narrowing that pricing edge could drive some potential DG customers to DEC or IBM.

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Users are slow to adopt Disoss

From page 1

Companies interviewed for Forrester's report gave four major reasons for not choosing to implement Disoss. One, they did not need the product. Two, they were put off by Disoss's "poor reputation." Three, they could not cost-justify implementing it. And four, they did not "believe in a mainframe-based office automation architecture" and were implementing another vendor's peer-to-peer network.

While offering Disoss connectivity has not helped minicomputer vendors broach new user installations, it *has* "kept them from being locked out of customer premises," according to Forrester research manager John McCarthy. "Just knowing that the Disoss link is available may prevent a company with a large IBM installation from dismissing a third-party vendor out of hand — even if it eventually decides to use the link rarely or not at all."

For example, Texaco Canada, Inc.'s Nanticoke Refinery in Ontario knew that a Disoss link was a prerequisite for its proposed implementation of Data General Corp.'s Comprehensive Electronic Office (CEO) office automation system. "We already were using Data General computers for process control, laboratory information processing and materials resource planning systems," says Tony Abraham, chief engineer of systems at the refinery. "It made sense to use CEO as a way to link refinery operations with administration and management support. We had tested CEO and thought it was a great tool for administrative and decision support, document distribution, calendaring and so on."

> ***Distributed networking is only one of several features that users want — and do not always get — from different vendors' Disoss products.***

The refinery wanted to replace its current OA system, an IBM 8100, with a DG MV 10000. "But we still needed to communicate with 8100s throughout the rest of the company, and for that we needed Disoss, which is standard here," Abraham says. "Management wouldn't have let us get CEO otherwise."

In June 1985, Nanticoke became a test site for DG's new Disoss link, CEO Document Exchange Architecture (DXA).

Abraham says users appreciate dealing with the menu-driven CEO interface rather than with Disoss, "which is really cranky. You have to fill in a lot of blanks before you can send something." Abraham also praises CEO DXA's distributed architecture, which allows him to access documents and messages right at his workstation. "With IBM's Disoss, the secretary at the head office would send a document to my secretary's 8100, and she would have to print it out for me."

Nanticoke has been testing each new version of CEO DXA as DG brings it out. DG still does not offer a Systems Network Architecture Distribution Services (SNADS)/LU6.2 implementation on Disoss that will allow peer-to-peer communications without the need to go through a Disoss host.

"That will be Version 3; we'll try it out when they release it," Abraham says. "We'll need it when we implement CEO in another Canada refinery — which should happen as soon as oil prices allow." Peer-to-peer communications is implemented through SNADS and PU2.1 running on top of Disoss.

Distributed networking is only one of several features that users want — and do not always get — from different vendors' Disoss products.

Wang's Hazelwood points out that Disoss does not offer the same level of support to all IBM systems. The 3270 Personal Computer, for instance, can only access documents in final (noneditable) form. (Disoss Version 3.3, which should be available shortly, reportedly eliminates this shortcoming.) Some IBM computers, such as Displaywriter, cannot receive transmissions directly but must periodically query a Disoss host for their incoming mail.

Third-party minicomputer vendors' Disoss implementations all suffer from one or more of the above limitations. Wang, for example, has yet to set a release date for a Disoss gateway that supports SNADS/LU2.1. And systems running its current Disoss release cannot receive mail directly but must use a mailbox on a designated Disoss host.

DEC's Disoss product, External Document Exchange, supports revisable and final-form library access but does not yet distribute mail in revisable form. A SNADS/LU6.2 implementation has been announced but not yet delivered. And Microvaxes, like IBM Displaywriters and Wang systems, cannot yet receive documents directly but must access a Disoss host system for their mail.

Chase Manhattan Corp. is currently evaluating Disoss in the role of "a transparent backbone for transmitting documents and messages" among an extensive installation of DEC, Wang and IBM equipment, says Craig Goldman, vice-president of Chase consulting and end-user support services.

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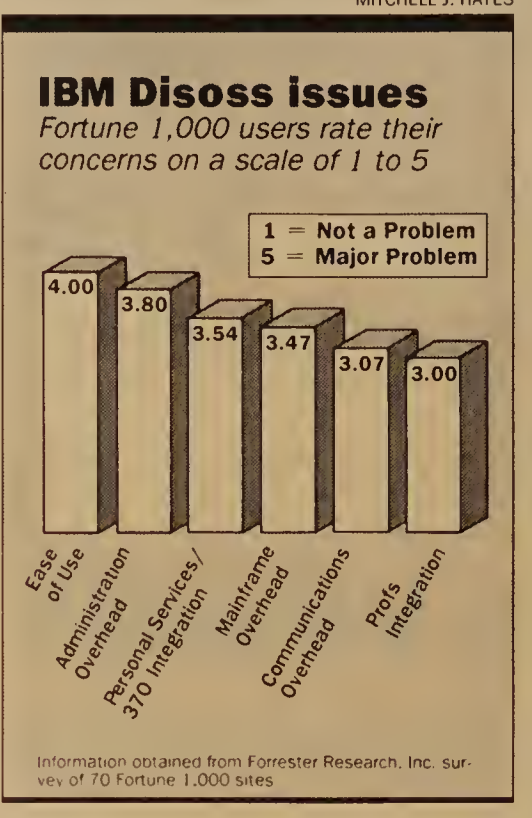

"We're thinking of letting DEC users have All-In-1, Wang users Wang Office, IBM users Disoss, and all have Disoss as the common connection."

Goldman is currently mulling over Disoss presentations that were recently given at the bank by DEC, IBM and Wang. His group is using the following criteria to evaluate the different products:

- Peer-to-peer communications among all three vendors' systems.
- The capability of preserving current user interfaces on each type of system. "I don't think we can survive if we have to add the burden of special command keys," Goldman says.
- Hidden costs. "There will no doubt be software development work to achieve true transparency, as well as training costs," Goldman says.
- The level of resources needed to support the new system. For example, user processors may need to be upgraded in order to support direct mail distribution. Adding All-In-1 might require a VAX upgrade.

"We believe we'll go with all three vendors; now we're discussing communciations strategies," Goldman says. "We have decided that even if the software is not all there now, in a year, it will be sufficient to lessen our burden."

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EXTs broaden Tandem low end

From page 4

current customers can reach out further into their outlying offices," said Kimball Brown, an analyst with Dataquest, Inc., a San Jose, Calif.-based market research firm.

A basic EXT10 and EXT25 configuration consists of one system cabinet that holds two processors and up to four 128M-byte disk units. Main memory capacity ranges from 8M to 16M bytes for a two-processor EXT10 and from 16M to 32M bytes for a comparable EXT25.

To create a maximum EXT10 or EXT25 configuration, users have to add a second system enclosure. Fully expanded, the two modules reportedly execute 8.3 and 22 transactions per second, respectively.

A two-processor EXT10 and a similarly configured EXT25 cost $82,500 and $325,000, respectively. The Model 6105 communications controller costs $5,455, the Model 6526 terminal, $1,095. Shipments begin during the current quarter.

TOP OF THE NEWS

NEWS from page 1

cheaper desktop systems.

Companies joining in last week's announcement and their products are Franz, Inc., Alameda, Calif., offering fall availability of an Extended Common LISP programming environment for the Unix System V/386; Arity Corp., Concord, Mass., Prolog for the Unix System V/386, early 1987; Lucid Software Corp., Menlo Park, Calif., Common LISP on Unix System V/386, early 1987; Gold Hill Computers, Inc., Cambridge, Mass., Golden Common LISP for PC-DOS, late 1986, for Unix System V systems, early 1987.

Other companies wrapping up deals with Intel at press time were Teknowledge, Inc. and Quintis Computer Systems, Inc.

Analysts agreed the Intel announcement opens the door for low-end implementation of AI applications, but stressed that it could be years before expert systems make their way to the end user.

"Intel's pressure now is not to the end user; it's to developers," said analyst Bob Lefkowits from Infocorp.

■

National Advanced Systems reportedly will try to counter IBM's attack on the high-end scientific and engineering market this week. The Mountain View, Calif.-based manufacturer of IBM plug-compatible mainframes is expected to announce a hardware and software package for its AS/XL series of mainframes, answering IBM's addition last October of a vector processing facility to its 3090 mainframes.

■

Ashton-Tate will follow on the heels of Lotus in announcing its own site licensing program on Aug. 19, according to software industry sources. Unlike the Lotus plan, which is scheduled for an Aug. 13 unveiling, Ashton-Tate's plan will allow corporate buyers to continue negotiating volume purchase agreements with retail dealers.

Meanwhile, on Aug. 11, Ashton-Tate will team up with Apple Computer to introduce a Macintosh version of Dbase III.

■

The 32-bit workstation market will heat up with tomorrow's announcement by Sun Microsystems of the latest members of its Sun/3 line. The principal release is expected to be a color version of Sun's low-end 3/50 system, priced in the $12,000 to $13,000 range.

One analyst says the low-end color system is Sun's belated response to Apollo Computer's popular Series 3000 Color Personal Workstation, priced some $2,000 higher at $14,900. "The Series 3000 has been a major success and a real sore point for Sun," the analyst says.

There is also speculation that Sun will introduce a high-end system based on Motorola's recently announced 68020 running at 25 MHz and rated at approximately four million instructions per second.

■

Symbolics rolls out AI machines, cuts prices

By Eddy Goldberg

BOSTON — In a move to stay ahead of growing competition among symbolic processing systems vendors, market leader Symbolics, Inc. last week announced two processors, one entry level and one middle range. The systems, used in creating artificial intelligence applications, will effectively replace three-quarters of Symbolics' 3600 development family. They reportedly offer improvements in such areas as software prototyping and programmer productivity.

Symbolics also announced a systems software access control package and price discounts ranging from 24% to 31% on its 3640, 3645 and 3670 systems, which will be discontinued. The price for the top-of-the-line 3675 has been cut 8% to 9%.

Taken together, last week's announcements are expected to strengthen Symbolics' position by consolidating its product line and making the evolution from low-end to high-end systems easier and more attractive for customers, according to Harvey Newquist, editor of "AI Trends," a newsletter based in Phoenix. "It also starts bringing their costs more into line with the general trends of the industry," he added.

The announcement gives Symbolics "a strong competitive position vis-a-vis traditional hardware vendors," such as Digital Equipment Corp., IBM and Sun Microsystems, Inc., said Curt Monash, senior vice-president at Paine Webber, Inc.

Symbolics President Russell Noftsker said the systems, the 3620 and 3650, are based on proprietary gate-array CMOS technology, introduced in April [CW, April 21].

The 3620, designed for entry-level development projects, offers 20% greater processing speed, yet it is 25% the size of the 3640, which it is replacing. A minimum configuration is priced at $49,900 with a 190M-byte disk and 4M bytes of main memory. The 3650 is 40% faster than the 3670 but only half the size. It comes standard with a 368M-byte disk and costs $65,900 with 4M bytes of main memory. They are available now.

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PBX threats produce bargains

From page 1

70% of all central office switches will be digital. "In the meantime, customers have to blackmail the local telcos, saying, 'If you don't upgrade to digital, I'll go private.' "

Business MIS managers could take a lesson in Centrex wheeling and dealing from the big universities, many of which have installations of 14,000 lines or more in complexes of hundreds of buildings over thousands of acres.

The University of Missouri in Columbia, with an installed base of 12,000 lines, is a case in point. The school was a dissatisfied user of Centrex 8311 from independent telephone company GTE Co., an "outdated system which has been in use since the 1970s," according to telecommunications manager Beverly Blackwell. "It offers call transfer and direct in-dialing, but no accounting or other enhanced features."

In May 1985, the university put out a request for proposal (RFP) for a new telecommunications system. "We thought we were going to go with a PBX — that's how we designed our RFP. But we wanted to let GTE take their best shot. What they came up with was basically a Centrex proposal and yet better than any of the CPE vendors' offers," Blackwell reports.

Under the terms of the university's new contract, signed last January, GTE is installing a DMS 100 switch in its central offices specifically to serve a portion of the Columbia campus. GTE retains ownership of the DMS host and serves other customers with whatever capacity the university does not use.

"The good deal is that, even though GTE owns, manages and maintains the switch, we are essentially buying the part we use — paying for it gradually with our Centrex fees and access charges," Blackwell says. At the end of five years, the university will be "paid up," and cease paying access charges.

The rest of the campus will be served by three remote switching centers, "which we need because we are so spread out," Blackwell notes. The university owns these switches, as well as the optical-fiber and coaxial cable that connects campus buildings. "The advantage of owning the equipment is that we have control and can do our own changes," Blackwell claims. "Meanwhile, GTE is managing and maintaining the basic system."

Pleasing a favored customer

The university's RFP acted as a spur for GTE to think up ways and means to please a favored customer. "We were very optimistic about getting a good deal with them, since we are their largest customer in the nation," Blackwell says.

Now is an ideal time for other large organizations to duplicate the University of Missouri's coup, notes Richard Kuehn, president of Cleveland consulting firm RAK Associates.

"Five or six years ago, I told users, 'Centrex is a dead issue. Get out of it.' That was still in postdivestiture days when AT&T could tell the Bell operating companies, 'force up Centrex rates so that users will be forced to buy Dimension PBXs.' Divestiture enabled the former Bell companies to do their own thing, and they want to hold on to their installed Centrex base," Kuehn says.

Not all customers are finding the divested Bell operating companies to be pushovers, however. A year ago, Pacific Northwest Bell refused to renew a Centrex rate stabilization agreement with Washington Trust Bank in Spokane, Wash. As a consolation prize, the bank obtained a "Corecom" agreement under which it would pay for local access to outside lines but not for such enhanced features as call-forwarding and call pickup.

The bank opted to stay with its Centrex services, despite a consultant's assurances that a PBX system would be less expensive, notes Assistant Vice-President of Central Services Gary Miller. One major reason was that the bank was on the verge of closing and relocating several of its branch offices and concluded it would be easier to reconfigure its Centrex services than to take down and/or install new PBX systems.

Another factor that may tie a company to Centrex is the size of its user population. "For a company like us, with 4,000 lines, a PBX is not really a consideration," said Joyce Varley, lead communications analyst with Fidelity Bank in Philadelphia.

Fidelity currently uses Centrex services at six Bell of Pennsylvania central offices — one serving the bank's headquarters, the other five serving branch offices. The bank is in the third year of a five-year rate-freeze agreement with the local carrier.

But the increasing number of small companies signing up for Centrex is being more than offset by a growing number of Fortune 1,000 corporations switching to PBXs, claims Northern Business Information, Inc. telecommunications analyst William Rich.

A recent report by the New York research firm states the total Centrex installed base increased by only about 10,000 lines in 1985 and by 50,000 lines in 1986. In contrast, PBX installations increased by 2.1 million lines in 1985, and by an estimated 2.28 million in 1986.

Combatting the trend

The divested Bell operating companies are currently trying to combat this trend in two ways. One is by offering enhancements that move Centrex systems closer to PBX functionality in both voice and data communications areas.

"The ability of a central office to allow the organization to use existing wiring for data can be a major factor in the decision to stay with Centrex or change to a PBX," says University of Nebraska Director of Telecommunications Services Ruth Michalecki. "Once a company decides to go to the trouble of rewiring a group of buildings for data transmission, it often takes that extra step and installs a PBX — which also requires new wiring."

The university is currently very satisfied with a packet-switching, data-over-voice service from independent Lincoln Telephone and Telegraph Co. The service provides 9.6K bit/sec. transmission among different computers on campus on the same wiring that carries Centrex voice transmissions.

Lincoln Telephone has also indicated its willingness to add a DMS 100 digital switch to the central office serving the university. "The analog switch we have now is 10 years old, and the manufacturer no longer supports it with new software development and enhancements," Michalecki says.

The second way local telephone companies seek to hold on to Centrex customers is through rate freezes and by "eating" the expense of hooking customers up to long-distance carriers. But they — and their customers — may be denied this option, if NATA has its way. In the last year and a half, the CPE vendor organization has filed complaints with the Federal Communications Commission against divested Bell operating companies' rate-setting policies.

NATA alleges that at least 12 local carriers, by absorbing access charges and offering other rate breaks to Centrex customers, are "increasing Centrex market share through discriminatory pricing at the expense of the CPE provider," according to Robert Aldridge, attorney at NATA's general counsel, Wood, Lucksinger and Epstein. NATA contends CPE vendors are "finding it harder and harder to make a profit because they must set prices to compete against a subsidized telephone offering."

The vendor organization also claims that other local telephone customers are being forced to subsidize the Centrex service on the basis of the fact that "Centrex rates are unrealistically low," Aldridge notes.

Controversy 'looming on the horizon'

Barbara Wheeler, Centrex product manager for Bell Atlantic Corp., admits the rate-setting controversy is "looming on the horizon" and that the decisions of state Public Utility Commissions are likely to determine the future price competitiveness of different divested operating companies' Centrex offerings.

"The issue of customer access charges must be settled soon; customers with 14,000 lines can't live with the threat of having to pay $6 per station access charges — which is a typical rate," the University of Nebraska's Michalecki says. "Some Bell companies are eating that charge now for some of their customers — but no one knows how long the situation will continue. The Public Utility Commission could come along and say, 'You will charge that much money.' "

Kuehn of RAK elaborates, "A rate stabilization contract only assures the customer that the local telephone company will not initiate a rate increase. It does not stop the Public Service Commission from doing it. I think the longer the rate stabilization period, the more likely it is that at some point the Public Service Commission will say, 'We can't keep raising resident rates and leave out this business or that university.' "

As protection against this future threat, Kuehn has recommended that his clients request that their Centrex contracts include a clause that lets them cancel the service without penalty if the Public Service Commission or FCC raises rates. "Some Bell companies have agreed to do this."

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	Sacramento	Jul 22, Sep 18, Oct 30
	San Diego	Aug 7, Oct 7, Nov 6
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Tandy clones target big firms

From page 1

people evaluating PCs are more concerned with value than ever. FUD — fear, uncertainty and doubt of not buying from IBM — is not as big an issue," Roach said.

Analysts generally applauded Tandy's strategy, noting that large corporations would be more inclined to buy from Tandy than from other clone makers because of the company's financial resources and nine-year track record in the PC business. In particular, the firm's creation of a dedicated sales force outside its Radio Shack Corp. outlets was lauded.

Thomas Wong, an analyst with Eberstadt Flemming & Co. in New York, said he believes Tandy has a good chance to penetrate the large corporate environment. "Corporations are looking at clones, and Tandy has the products and support to be a viable competitor," he said. "It's just a question of initial costs to staff up and how long it will take them to penetrate the market."

Business-oriented micros

The new business-oriented micros range from the Tandy 1000 SX, said to run twice as fast as the IBM PC and retailing for $1,199; the 3000 HL, an Intel Corp. 80286 machine aimed at the Personal Computer XT market and selling for $1,699 in a floppy-based version without a monitor; and the 3000 HD, a 40M-byte hard disk version of the firm's Personal Computer AT-compatible Model 3000, priced at $4,299.

At a press conference at the Waldorf Astoria, Roach stressed that Tandy's new PC-compatible computers are part of the firm's attempt to broaden its focus to include Fortune 1,000 users, a strategy that has included increasing its outside sales force by 40% during the last four months.

The thrust, he said, is to provide business users with a richer feature set at a lower cost than IBM and other clone makers. He stated that "1986 is the year PC-compatible people focus on value. Offering only PC compatibility is no longer state of the art."

> ***Tandy's new PC-compatible computers are part of the firm's attempt to broaden its focus to include Fortune 1,000 users.***

Ron Stegall, Tandy's Business Products Division vice-president, said a number of large corporations have recently signed contracts to purchase Tandy microcomputers, although he declined to identify those companies.

He did, however, point to a recent study done by the Gartner Group, Inc. of Stamford, Conn., that ranked Tandy behind IBM as the second largest supplier of microcomputers to companies with sales of less than $500 million. Although Tandy's 22% of the market measured well below IBM's estimated 45% of the market, its new products, sold through a better trained, 1,500-member outside sales force, should help close the gap, Stegall said.

Other analysts believe Tandy, like other PC clone vendors, is caught in a bind. The firm is viewed as a lesser alternative to IBM despite offering better price/performance than Big Blue.

"MIS guys will give any excuse to buy from IBM rather than anyone else," noted Steve Bosley, an analyst with International Data Corp. (IDC) in Framingham, Mass. "I'd be real surprised if Tandy was successful selling to large corporations."

While Tandy has established a solid reputation in capturing small business accounts scattered across Middle America, Bosley contends the firm has been hard-pressed to attract corporate users. "They sold 154,000 units to business professional users last year, which represented 5.7% of the market," Bosley said. "They have a lot of people to climb to get to the top."

Tandy recently put its outside sales force on commission and began offering volume discounts that, at the low end, exceed IBM's. "We offer discounts ranging from 12% to 30%, depending on quantity," Stegall said.

"It's like the analogy: If Muhammad won't go to the mountain, then the mountain has to come to Muhammad," noted Joseph Levy, a spokesman for IDC.

Features of the Model 3000

The Model 3000 HL features an Intel Corp. 80286 microprocessor operating at 4 or 8 MHz, supporting Microsoft Corp. MS-DOS 3.2, 512K bytes of random-access memory (RAM), a 360K-byte floppy disk and seven expansion slots, four PC XT slots and three PC 16-bit slots, the firm noted. Options includes a choice of 1.2M-byte floppy and 20M- or 40M-byte hard disk drives. It, too, can attach to Vianet, Tandy's PC cluster network, Tandy said.

The 40M-byte hard disk version of the 3000 HD includes 640K bytes of RAM and supports both MS-DOS 3.2 and Microsoft's soon-to-be-released Xenix 5.0. Under Xenix, up to six users can work simultaneously on one Tandy 3000, the firm said.

The 3000 HD comes with 10M bytes of additional storage, 126K bytes of additional RAM and greater expandability than the PC AT, Tandy said. Ten expansion slots are offered, accommodating seven PC AT cards, two PC XT cards and one PC XT half-slot card.

The Model 1000 SX is an Intel 8088-based machine, running most MS-DOS-compatible software at 7.16 MHz, software switchable to 4.77 MHz, Tandy said. It is offered with a new version of Personal Deskmate, an integrated program combining basic word processing, spreadsheet, electronic filing, graphics, calendar and telecommunications functions.

The 1000 SX comes with 384K bytes of RAM, expandable to 640K bytes of RAM on the motherboard; dual, double-density, double-sided 360K-byte 5.¼-in. floppy disk drives; and five expansion slots, with a socket for an 8087 coprocessor. It is offered with standard connectors for a parallel printer, two joysticks, a light pen, monochrome monitor, composite video and audio and color monitor. The base price of $1,199 includes MS-DOS 3.2 and Microsoft's GW-Basic.

The micro can attach to Vianet as well as to IBM's PC Network local-area network.

Models 1000 SX and 3000 HL replace Models 1200 and 2000, respectively, which are being discontinued, Tandy said. The firm said it is already sold out of the Model 2000, although limited quantities of the Model 1200 remain.

Three new printers include a 20 char./sec. daisywheel printer, priced at $399.95; a 43 char./sec. daisywheel priced at $995; and a dot matrix printer, operating at 240 and 80 char./sec., priced at $1,295, which the company is positioning as an entry-level desktop publishing unit.

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IBM hints at price cuts, enhancements to boost 3090 sales

Big Blue says moves likely in September

By James Connolly

IBM officials have told customers to expect enhancements or price cuts next month that could boost the price/performance ratings of 3090 mainframes and drive users from the older 3080 mainframe family to the 3090 line.

According to industry observers, IBM representatives have told some customers that the company plans to effectively kill the 3080 as a market force by making the 3090 more attractive to customers who have postponed purchase decisions while watching for a clearer price/performance difference between the two product lines.

However, there is no consensus about whether price cuts or enhancements would sufficiently spur 3090 sales to boost IBM profits or about the size of any price cuts.

Analysts have complained since shortly after the first 3090 Model 200s were shipped last September that there were too few features in the 3090s to set them apart from the older 3080s, which are available primarily on the used market or as upgrades. Some of the speculation has centered on the possibility that 3090 performance will be boosted through the addition of more processors or the substitution of more powerful CPU boards.

The anticipated September price cut would be the second of the year for the 3090s. The prices for the multiple-CPU 3090 Models 200 and 400 were slashed by 10% in February.

However, one IBM executive, who asked to remain anonymous, recently hinted that because of those earlier cuts, third-quarter performance enhancements are more likely than a second round of price cuts.

One industry observer, Robert A. Bardagy, senior vice-president of marketing for Comdisco, Inc., commented, "There have been rumors for quite some time that there will be a 3090 price cut sometime between now and year's end. That would fit in with IBM's tradition of cutting prices in September. The other side of the coin is that a 5%, 10% or 12% cut is not enough to stimulate demand by itself." Comdisco leases IBM mainframes and is active in selling used 3080s in the third-party market.

'Most people are just not buying'

Analyst Francis Gens, a vice-president with International Data Corp., a Framingham, Mass.-based market research firm, reported that even if what IBM is telling its customers about a September announcement is true, the sluggishness of the 3090 market cannot be blamed on the competition from used 3080s. "Our surveys show that not that many people are going to used 3080s instead of 3090s and that the lack of differentiation isn't a big issue. Most people are just not buying."

Bardagy said 3090 enhancements make more sense than price cuts if IBM's goal is to maintain its profit margin for the mainframe. However, he questioned whether all of the potential enhancements are sufficiently developed to be announced.

Three possible enhancements, each of which would be considered major, according to Bardagy, include the following: an increase in the 3090's channel speed from 3M byte/sec. to as much as 6M byte/sec.; a new version of the MVS/XA operating system; and an improvement in cycle time from 18.5 nsec to 16 nsec.

However, Frederic G. Withington, a vice-president with Arthur D. Little, Inc., said that not only are price cuts likely to be announced as IBM answers the challenge of the 3080 and the Japanese-made mainframes, but major performance boosts for the 3090 are also probable.

"I think the Japanese are more important to IBM than the 3080 factor. They keep playing leapfrog and trying to keep the pressure on each other," Withington said.

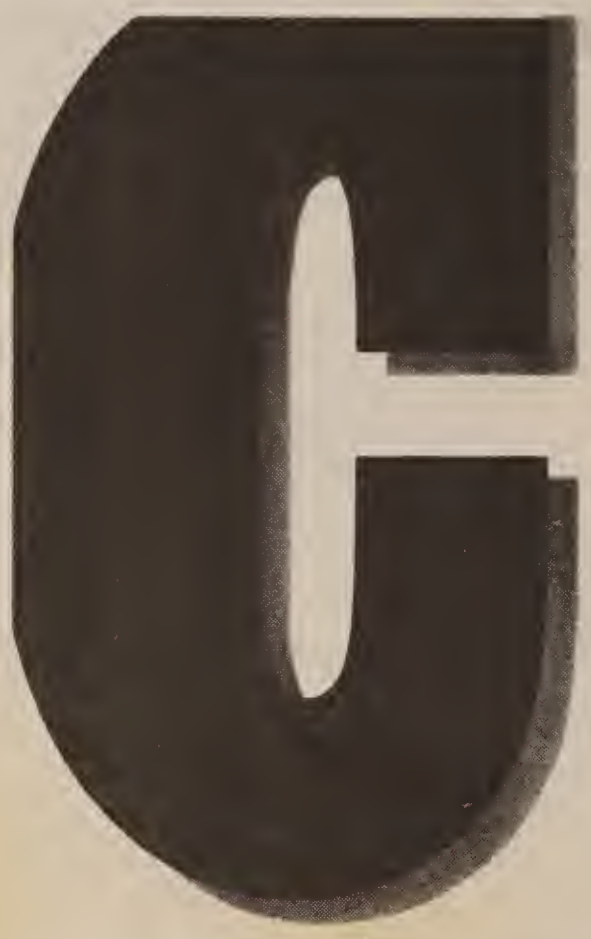
Withington expects that rather than increasing channel speeds or replacing MVS/XA, IBM will introduce new 3090 configurations by adding two or four processors to the four-CPU Model 400. He also said IBM might introduce new emitter-coupled logic (ECL) chips to the 3090's CPU to keep pace with the ECL technology used by competitors. He said it is possible that new ECL-based technology could be offered on a field-upgrade basis, minimizing the risk of alienating users who have acquired 3090s within the past year.

Expects minor 3090 announcements

One analyst who expects only minor 3090 announcements for next month is Dale Kutnick, senior vice-president of the Gartner Group, Inc., a Stamford, Conn.-based market research firm. "I don't think you will see any price cuts at this point. If you do see any they will be minimal, maybe for something like the Model 150," Kutnick said.

Kutnick said his company "continues to be somewhat cautious," telling customers to buy 3090s only as they need them. He said the new release of MVS/XA is needed to make better use of the 3090's multiprocessing abilities and expanded storage, but that even if the channel speed is increased, users will need a new controller to support it.

Kutnick added that the enhancements, such as a new MVS/XA and more active promotion of the 3090 Model 400 (which is scheduled for October shipments), are more likely to be added after Jan. 1, when IBM hopes to get off to a strong financial start for the new year.



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Micro-mainframe links dominate info center conference

Environment tool among rollouts

By Peggy Watt

ANAHEIM, Calif. — The several hundred attendees at this year's Information Center Conference & Exposition last week saw a handful of products unveiled, including several upgrades to existing products. Microcomputer-to-mainframe communications and other connectivity issues were primary among the capabilities that were announced at the show.

Among the products unveiled were the following:

• Proteo, a software tool kit for the IBM Personal Computer and compatibles, is used to create an environment for micro to mainframe integration and is produced by a recently formed company called Proteo Software, Inc. of Markham, Ont. The company is a joint venture of Online People, Inc. of Toronto and Norenco Corp. of Minneapolis.

Proteo Software President Art Benjamin said some features were drawn from the integrated interface pioneered at Xerox Corp.'s Palo Alto Research Center. He said the simpler interface reduces training time.

Proteo is not an operating environment itself but provides the tools to create that environment and customize it for the individual user. It shields the user from operating system commands with natural language commands, uses icons where appropriate and enables the user to access data without worrying about whether it is stored locally, on a network or on a mainframe, Benjamin said.

It also features "software robots," user-definable macro commands for backup procedures, filing and sending of electronic mail, all of which can be conducted when the user is not at the keyboard. Proteo's name stands for Professional Tools for the Electronic Office.

Data can be input by menu, mouse, joystick and other alternatives, including voice. A Watson voice digitizer board from Natural Microsystems Corp. of Natick, Mass., is included with the purchase of a single-user version, which Benjamin said is available for $695. But the company is really eyeing the corporate site license sale, allowing unlimited copying throughout a corporation for a $30,000 contract through Sept. 1 and $40,000 after that date.

> ”
>
> *The user receives only the information needed for the programs in use at a single workstation.*

• The Micro Resource Manager from Atrium Information Group, Inc. of Fairfield, Iowa, offers a flexible data base system designed to help the microcomputer manager track, support and analyze the use of microcomputers within a corporation.

The package is designed for the IBM PC and compatible computers and includes standard purchasing and receiving files as well as analytical report forms for planning and budgeting, according to President Ken Ross.

Its calendar functions track user requests, management's electronic answers and progress on the requests, a function that Ross said will help document staff activity.

The system can also retain documentation files that can be printed out as a customized manual for the user, who then receives only the information needed for the programs in use at a single workstation, "rather than drown the user in unfocused information," Ross said.

"It's designed to be an efficiency tool, a time saver," he said.

The multiuser version will be available in the fall and will run on IBM Netbios-compatible PC networks as well as under Unix and Microsoft Corp.'s Xenix systems, Ross said. The Micro Resource Manager system sells for $4,995 for an unlimited number of workstations. A start-up version is available for $1,495 and supports as many as 250 PCs.

• Concurrent Micro-Mainframe System from Vasco of Lombard, Ill., an authoring system for mainframe computer-based training, allows transactions to take place on a microcomputer workstation on-line with a mainframe or minicomputer.

Training takes place on the actual application via a window training shell. The pop-up instructions or Help files are similar to the reference guides already marketed by Vasco.

As a training corporation, Vasco will enter contracts to customize particular applications for computer-based instruction under Concurrent Micro-Mainframe System or license it for the user to customize.

Fees are $20,000 per mainframe system plus an annual maintenance fee of $4,000. Annual rental is $10,000, including maintenance.

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World Digest

Auto maker supports MAP

By Takehisa Kondoh

NAGOYA, Japan — One of Japan's leading vendors of automobile electronics gear, Nippondenso Co., said this week it will use General Motors Corp.'s Manufacturing Automation Protocol (MAP) as the basis for a factorywide local-area network (LAN). The move makes Nippondenso the first Japanese auto industry player to support MAP.

MAP is an implementation of the International Standards Organization's Open Systems Interconnect protocol, which allows computers from different vendors to communicate over a broadband LAN.

The Nippondenso LAN, to be installed at a Nippondenso factory still under construction, will be connected to the equipment that will produce fuel-injection devices and semiconductor chips.

Construction of the $636.9 million factory began in May and will not end until 1995.

Nippondenso hopes to use the LAN to establish an automation system that covers every aspect of manufacturing from order taking to delivery. "We are tilting toward MAP as a factory automation protocol that may become the international standard," a Nippondenso spokesman said.

Nippondenso, a Toyota Motor Corp. affiliate with 1985 revenue of $5.8 billion, is prepared to develop, by itself, the MAP-compatible computers, communications equipment, robots and machine tool controllers needed for the new factory.

Some of that new equipment will be supplied by AB Denso Corp., a joint venture the firm established in 1984 with Allen-Bradley Co., a U.S. factory control system maker.

Nippondenso's move is expected to push other Japanese industrial manufacturers closer to MAP support.

Several Japanese manufacturers — including Fanuc Ltd., a robotics maker, and OMRON Tateisi Electronics Co., a factory automation vendor — have already announced plans to test MAP for use in their networking products.

Other manufacturers, however, are reportedly hesitant to support MAP because they are concerned that optical-fiber networks will prove superior to MAP's coaxial cables for data transmission.

Japan breaks chip record

TOKYO — Japanese semiconductor production in June hit a record monthly high of 985 million units, up 11.2% from the same month a year ago.

According to Japan's Ministry of International Trade and Industry, the previous monthly production record had been 934 million chips, set in November 1984. The dollar value of June's production was not disclosed but is said to have decreased some 10% from the same period a year ago.

Europe wary of price war

PARIS — The current semiconductor trade battle between the U.S. and Japan has created new opportunities and perils for European semiconductor vendors.

That battle may have ended last week as the U.S. and Japan concluded their semiconductor trade talks and set about implementing corrective action that could make Europe the next semiconductor battleground.

Like U.S. companies, European chip vendors have felt the pinch of aggressive Japanese pricing. But while European semiconductor vendors applaud the U.S. effort to fight back, they are uneasy about U.S. and Japanese efforts to set the rules for a game in which they all are playing. European vendors are particularly concerned that semiconductor price protection in the U.S. will make Europe the site of the next chip price war.

W. Germans end monopoly

BRUSSELS — The West German government agreed last week to end the monopoly that the national post and telecommunications authority, the Bundespost, holds on the supply of modems.

The action comes in response to a ruling by the Brussels-based Commission of the European Community that the monopoly is illegal.

The ruling, announced recently by the European Community, means that private vendors will be able to supply internal and external modems directly to customers.

Lab to make chips in space

TOKYO — Three Japanese government agencies, including the Ministry of International Trade and Industry, agreed recently to begin a $193.5 million, six-year effort to develop and build an unmanned space laboratory. The lab, to be launced in 1992, will produce semiconductors and new materials that can only be made in a zero-gravity environment.

The lab, called the *Free Flyer*, will be retrieved by the U.S. space shuttle after orbiting the earth for six months.

Bull to offer cabling system

PARIS — Groupe Bull, France's leading computer manufacturer, is expected to introduce its first cabling system at the Sicob office automation trade show that will take place in September.

The Bull Cabling System reportedly sets the specifications for wiring a new building or rewiring an existing site.

The system will be based on twisted-pair wiring and a star-shaped architecture similar to AT&T's Starlan system, sources said. Bull has already chosen Ethernet 802.3 standard as the basis of a 10M bit/sec. network to link hosts within a building.

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Ashton-Tate, Comshare join on micro-to-mainframe link

Target corporations with proliferating PCs

By Peggy Watt

TORRANCE, Calif. — Ashton-Tate took another step in its efforts to provide customers with third-party micro-to-mainframe options, announcing a link with Comshare, Inc. Under the agreement, users of Ashton-Tate products will be able to engage in a two-way direct micro-to-mainframe data exchange with Comshare's System W decision support software.

A new release of Comshare's W/Information Gateway accommodates Ashton-Tate's Dbase II, Dbase III Plus and Framework II, allowing users to collect and edit data and upload it to a mainframe data base for storage and reports. Those reports can then be shared through Comshare's Commander EIS for sending charts and reports from the mainframe to the workstation.

"Micros are part of the picture now, and managers are looking for ways to move that data," said Keith Kremer, Comshare marketing director.

Kremer said Comshare and Ashton-Tate share many of the same kinds of customers, particularly large corporate users with large data bases and proliferating numbers of personal computer workstations. Financial analysis and business strategy planning are two of the biggest uses of Comshare wares, he claimed.

"We hear it again and again from customers, 'How do we tie all these things together?' " said Ron Arons, marketing programs manager for office automation at Ashton-Tate. "We're not about to sell mainframe software, but we would like to go in with someone who already knows that market," he noted.

The W/Information Gateway release costs $450 per user. It runs on an IBM Personal Computer or compatible system and a 3270 Personal Computer with 512K bytes of random-access memory. The release supports coaxial communications using a variety of communications boards or asynchronous communications through a Hayes Microcomputer Products, Inc.-compatible modem.

The updated Comshare product is available immediately through Comshare's direct sales force, but it will also be jointly marketed by the two companies.

The companies will share marketing and promotions and train each other's sales staff to promote the new capabilities.

Comshare products can already exchange data with products from Lotus Development Corp., which has also recently pursued the micro-to-mainframe link.

This is the latest in a string of cooperative micro-to-mainframe third-party products offered by Ashton-Tate.

The company has similar agreements with nine other developers of mainframe software, including Applied Data Research, Inc. of Princeton, N.J.; Cincom Systems, Inc. of Cincinnati; Computer Corporation of America in Cambridge, Mass.; Cullinet Software, Inc. of Westwood, Mass.; Informatics General Corp. of Canoga Park, Calif.; Management Science America, Inc. in Atlanta; Micro Tempus, Inc. of Montreal; Software AG of Reston, Va.; and TSI International in Wilton, Conn.

Automation at PTO criticized

By Mitch Betts

WASHINGTON, D.C. — A Texas congressman recently charged that the massive automation project currently under way at the U.S. Patent and Trademark Office (PTO) has been mismanaged and called for the project to be reassessed.

Oscar Mastin, a spokesman for the PTO, said last week that the office has no response or comment concerning the allegations of mismanagement made by U.S. Rep. Jack Brooks (D-Texas).

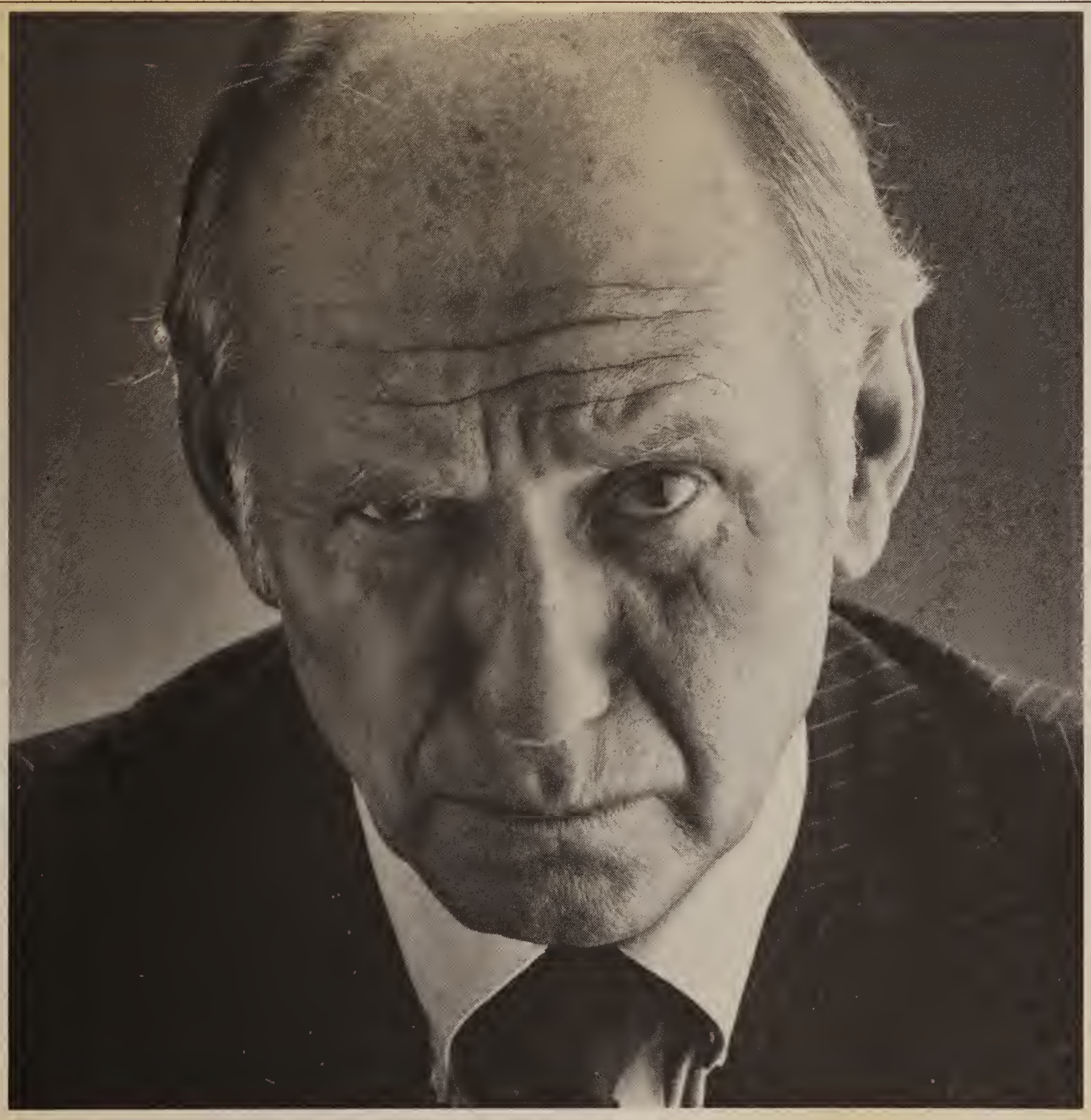
The $808 million automation project is intended to put 27 million documents on optical disks linked to custom workstations to improve the patent search capabilities [CW, Dec. 3, 1984].

A report written by the U.S. Congress' General Accounting Office (GAO) and released by Brooks concluded that planning of the patent automation program have been inadequate, that certain federal contracting rules were ignored and that the program is a year behind schedule and more costly than expected.

The estimated cost of the 18-year prime contract with Planning Research Corp., a systems integrator based in McLean, Va., has increased by 55% to $448 million, the GAO said.

According to the GAO audit, the PTO pursued automation with little regard to costs, used an inaccurate cost-benefits analysis and did not consider alternatives to automation.

The GAO report said the the Department of Commerce should stop funding the program until its direction and scope are reassessed.



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VIEWPOINT

EDITORIAL

Seizing power

If "power to the users" means millions of instructions per second and other performance benchmarks to you, then you may be more an "appliance operator" than a true citizen of the information age. So says author Jay Bloombecker in this week's In Depth article on the growing legislative influence of computer users groups.

The moniker is purposely pejorative. Bloombecker wants to anger computer professionals into raising their voices on legislation that directly affects the workaday world of MIS: software licenses, software warranties, operation of bulletin boards, taxation of software and regulation of VDT use.

When corporate or individual users have banded together, most often in users groups, they have met with remarkable success in confronting the well-financed, well-organized vendors that attempt to lobby laws into existence for their own benefit.

Witness the efforts of Technical Evaluation through Strategic Cooperation, a group of 31 Fortune 100 managers who pushed ADAPSO into creating first a microsoftware customer and vendor advisory board, then guidelines on microcomputer software warranties. The battle to guarantee that software performs as promised is not yet over, but TESC won a significant victory for corporate users who refused to accept as adequate vendor-initiated warranties.

In another series of victories, computer users in several states including Arizona, California, Illinois and Hawaii beat back vendor attempts to pass legislation that was billed as protection against software piracy but in reality was an attempt to limit software manufacturers' responsibility for product performance.

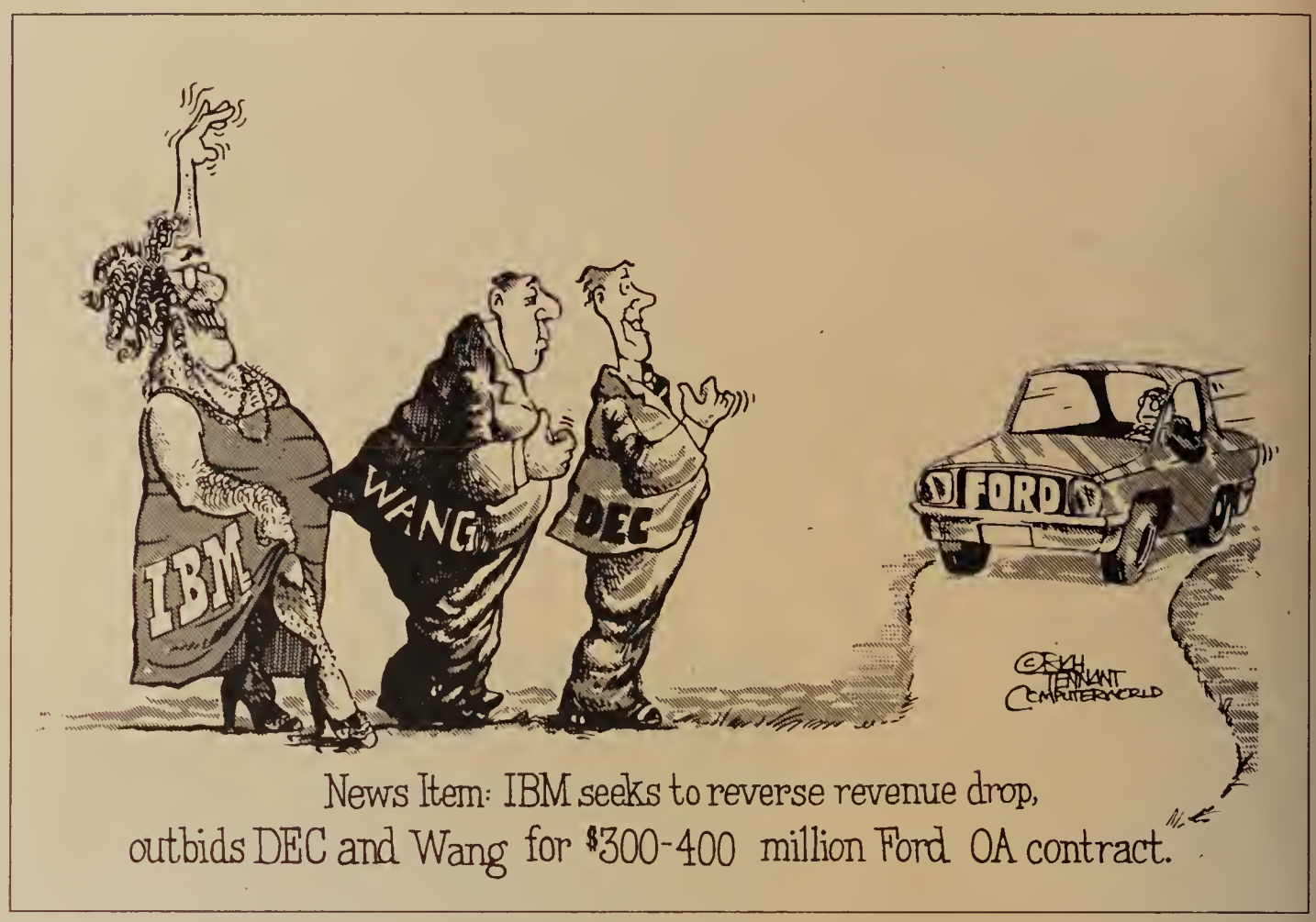
Similar successes have been won in the standards arena, despite the fact that standards-setting bodies are traditionally dominated by vendors that most benefit from spending money and time in world capitals hashing out protocols.

As reported in these pages last week, vendors are finally attending to a growing number of users who want the networking functions promised by long-awaited, long-delayed Open Systems Interconnect protocols from the International Standards Organization. These users are turning to the Transmission Control Protocol/Interconnect Protocol originally developed for the military, and vendors are tagging along behind, grudgingly providing the needed support.

On a grander scale, General Motors Corp. bestowed Manufacturing Automation Protocol on the computing world. Vendors that worked for years on Ethernet, let us say, might question the audacity of a user determining a standard. But the point is that GM recognized the importance of standards and so took control of its own fate.

Of course, MAP is technically an OSI protocol. But at least GM got a chance to determine that part of OSI that most impacts its own needs and those of other manufacturers.

In short, there is power for the taking, particularly when users band together. Wise MIS managers will use the tools of their trade — computers, networks, bulletin boards and technical and professional groups — to help shape the agendas of vendors and legislators alike.



News Item: IBM seeks to reverse revenue drop, outbids DEC and Wang for $300-400 million Ford OA contract.

LETTERS TO THE EDITOR

Automation can't turn GIGO to PIPO

The In Depth feature, "Paper chase: Keeping up with office productivity" [CW, July 21], by Edward Yourdon, has inspired me to write. The headline and teaser of this article both attracted my attention, since I am an office worker and want to be properly equipped so my company can compete successfully.

When I came to the fourth paragraph, my enthusiasm waned. I read the rest of the page with increasing astonishment. I had believed the author wanted to promote the concept of office automation to staff and managers. What the author accomplished was to insult the entire secretarial profession and then go on to trash the postal service.

"Many organizations are also finding it increasingly difficult to hire competent clerical and administrative people, thus making it necessary for the few competent administrators to be more productive and for managers to do more and more activities for themselves," Yourdon writes. I agree. Competent people are rare in any field but especially those in which salaries and career paths are out of tune with the degree of responsibility and detail work required. Aside from here, where is it written that it is the manager's responsibility to compensate for lack of skills or motivation in all employees? There are assumptions operating here unlikely to be shared by most clerks, administrators or managers.

As Yourdon proceeded with this profession assassination, the insight I obtained was that he missed the point. Scarcity of high-quality personnel is a problem that will not be solved by office automation.

On the contrary, new technology and procedures call for increasing levels of skill and awareness to maximize their effective use. While the modern executive can keyboard correspondence, run it through a spelling checker, dictionary and thesaurus and have it print out automatically formatted in the proper company style, an office professional with good administrative and interpersonal skills will remain a necessary member of any management team.

I enjoy the new age of office automation when I no longer need to go through my executives' texts with a fine-tooth comb for spelling and spacing errors, never have to keyboard an address twice, keep the same pencil for a year, post bulletins with the sweep of an Enter key and maintain my Rolodex on file. However, I suspect it will be a while yet before the personal computer will tell the vice-president that the marketing director already sent a memo addressing that issue or that there are three more people who should have copies of a proposal.

It takes judgment and skill to assure PIPO (perfect in/perfect out) rather than GIGO (garbage in/garbage out).

My suggestion to Yourdon is that if he hired educated, intelligent secretaries at professional wages with continuing education benefits and opportunities for career growth, he would never have met the young lady who disillusioned him so. If he wants to encourage the advancement of office automation, he should consider the possibility of taking a more than superficial look at the field of information processing and the ways in which its growth is being influenced by professional secretaries, information specialists, word-processing operators, the institutions that train them and their associations.

Sheila M. Oranch
Administrative Secretary
Natick, Mass.

Missed deadlines cause late delivery

The column, "Technical edit cause of delay" [CW July 14], stated that the technical review process can cause a delay in the implementation of the project.

This is very true. However, I would like to extend this to include all review processes: the functional requirements, design documents, program specs and especially the resolution of outstanding issues.

The implementation date seems so distant during the design phase that the analysts and clients think they can delay meetings and miss deadlines for approving published documents without affecting the implementation date. Then when testing is not going well and the date may be missed, everyone blames the programmers for not putting in enough overtime.

If the analysts and clients would work some overtime at the beginning of a project, more implementation dates would be met and programmers would not have to work around the clock in order to meet those dates.

Marsha J. Rogers
Programmer/Analyst
Indianapolis, Ind.

VIEWPOINT

In praise of a corporatewide information strategy

Dexter owns a business. It is big, for a business run almost single-handedly by its founder, and it is growing nicely. It has departments that offer different aspects of the firm's service to different types of customers. Two of these departments can justify their own multiuser computing capability.

Dexter is not a computer type. He knows that the manager of each department can make intelligent decisions. So he let each one decide what computer to get. They are not computer types either, so they got consultants.

The consultants were competent. But each consultant was hired by the manager of one department to look at the needs of that department. The consultants did their assigned jobs well. One department got a Hewlett-Packard Co. HP 3000. The other got a network of IBM Personal Computer XTs and ATs.

By itself, each decision was reasonable. The department with the HP 3000 uses a common data base. The other department consists of independent workers who need computation capabilities and graphics. PC ATs give them enough power, and the network gives them sufficient information exchange capabilities.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

Unfortunately for Dexter, the world is not static. Sooner or later somebody will realize that his two customer groups come from the same corporation. That somebody will realize that coordinating both sides of Dexter's firm could be a handy marketing and decision-making tool. Somebody will also realize that the computers already have the necessary data. So the poor soul will try to combine both halves.

That is when the bubble will burst. The two departments' information strategies are being developed with no thought of eventual cooperation. Each is proceeding happily down the path of local optimization.

By EFREM MALLACH

The transaction processing programs on the HP 3000 will take advantage of every little quirk of that machine. The packages bought for the PCs will be selected for functionality, support and the like — but not for file structures that facilitate data interchange.

In return for a few percent more efficiency today, Dexter is buying a lot of future headaches.

Importance of information strategy

It is easy to look at the situation from the outside, when the long-term issue has been pointed out, and to see what went wrong. Dexter should have thought about his corporate information strategy before spending several hundred thousand dollars. Had the decision been made to standardize on the HP 3000, the PC users would have found that it can do computation and graphics.

Had Dexter opted for more PCs, there are file servers available to construct a shared data base. Neither of these approaches is optimal for the other purpose. Both would require some extra work. The specific choice is not the point. The point is that any choice should be made with a view to where Dexter wants to be in five years. Any other approach, any short-term view of the issues, will turn Dexter into a wholesale Excedrin user by 1990.

We cannot expect Dexter to worry about this. As the saying goes, "When you're up to your ears in alligators, it's tough to remember that your mission was to drain the swamp." Dexter is up to his ears in alligators. The last thing he wants to worry about is an information systems strategy. If he is trying to grow his business, that is also the last thing he should have to worry about.

One solution is to have a chief information officer. This concept, analogous to that of a chief financial officer, was first proposed by William Synnott and William Gruber in their book *Information Resource Management: Opportunities and Strategies for the 1980s* (Wiley, 1981).

The chief information officer integrates information technology with business needs and makes sure the whole organization pulls in the same direction. The information officer must have both technical competence and a corporate strategic perspective. The strategy must address both present needs and future goals.

All is not lost

Suppose Dexter does not want (or really need) a chief information officer. All is not lost. First, he must recognize that information is a critical business resource in the 1980s, a fourth element of the traditional management-labor-capital base on which businesses are built.

Therefore, any departmental information systems proposals must be reviewed at the top for their corporate implications, just as capital budgets are routinely reviewed today.

Second, the consultants should be told to address the implications of their proposals for the other parts of the business. Just as Dexter's managers would not accept business proposals that ignore what another department is trying to do, they should not accept information systems proposals that do not address what is being done elsewhere.

Dexter does not have to do it himself. He does not even have to hire somebody full time to do it. But, as chief executive, he is responsible for seeing that it gets done. If he does not do it now, he will suffer later.

Work value analysis as yardstick for end-user productivity

READER'S PLATFORM

By A. PERRY SCHWARTZ

Although most information systems specialists are believers in the productivity gains brought about through end-user computing, some executives are beginning to question its value . . . especially where they have seen personal computers gathering dust or heard of machines being turned into paperweights.

Now that the novelty has worn off, management is apt to weigh the benefits of this gear against many other useful expenditures. In this context, how do office automation, PCs, local-area networks and departmental computers stack up? Lately, not all that well.

A major problem has been that it is often impossible to determine the benefits of end-user computing, not because these benefits do not exist, but because business analyses have been squishy concoctions of wishful thinking and naive economics.

Objective cost-justification

If end-user computing is to resume its growth, information system specialists must finally be prepared to provide sound and objective cost-justification.

In cases where white-collar effort, enhanced by end-user computing, can be traced directly to the bottom line, the analysis can be very straightforward. The problem is to develop a model of the cash flow. Unfortunately, these cases are in the distinct minority.

In the vast majority of cases where white-collar work enhanced by end-user computing yields indirect benefits, we have come to favor what we call work value analysis as a means of determining productivity increases.

Work value analysis, which has been developed in joint studies with EDS Corp., is based on the fact that white-collar workers must divide their time among a variety of activities. Some are higher value activities: for example, an engineer designing an antilock braking system for a new car or a financial analyst deciding how to invest the funds of a thousand customers.

Lower value and lost-time activities

On the other hand, proofreading a report for spelling errors or locating reference materials must be looked upon as lower value activities. And time spent waiting, traveling or looking for a missing file may be regarded as lost-time activities.

Viewed in this context, the objective of introducing end-user computing is twofold: one, efficiency — to allow the white-collar worker to accomplish activities in a shorter period of time; and two, effectiveness — to shift time from lost-time and lower value activities to higher value activities.

Work value analysis empirically determines the value of each work activity, based on salary and other factors and objective measurement of how professionals are spending their day. This method has worked very well to account for gains in efficiency and effectiveness and to document the projected benefits of end-user computing, in dollars and cents, for hundreds of employees in major companies. By comparing before and after measurements, these benefits can be objectively verified.

One criticism, which surfaced most recently in "Cost justifying investments in office systems" [*Computerworld Focus*, May 14], that has been leveled at work value analysis and other activity-based measures of white-collar productivity is that these methods fail to take into account the fact that white-collar work is neither discrete, standardized nor repetitive.

Although this criticism seems reasonable on the surface, evidence reported by a number of management experts refutes it.

One such expert is Henry Mintzberg. After a careful study of managerial jobs, he labeled as a myth the notion that managers and professionals perform mostly nonrepetitive and unstructured duties. According to Mintzberg's findings, reported by him in *The Nature of Managerial Work* (Harper and Row, 1973) and in a *Harvard Business Review* article, "The manager's job: Folklore and fact" (July-August, 1975), the work of professionals actually follows a highly regular pattern.

Work follows a predictable pattern

Another noted management specialist, Harvey Poppel, the architect of Booz, Allen & Hamilton, Inc.'s study of the office of the future, also found that white-collar workers devote their time to activities in a very predictable manner.

This study, covering more than 300 workers in 15 organizations and more than 90,000 time samples, was reported in "Who needs the office of the future?" (*Harvard Business Review*, November-December, 1982).

Thus, contrary to popular folklore, white-collar work does follow a repetitive, structured and predictable pattern. Consequently, the benefits of end-user computing can be objectively measured.

Schwartz is president of Computer Research Associates, Inc., a research and consulting firm in Atlanta.

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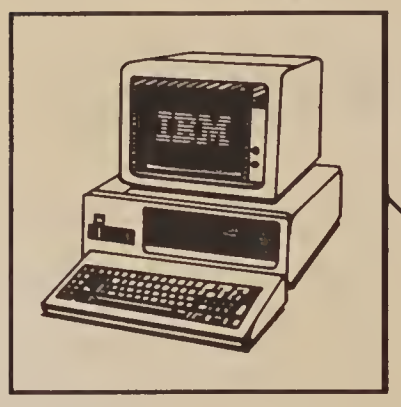

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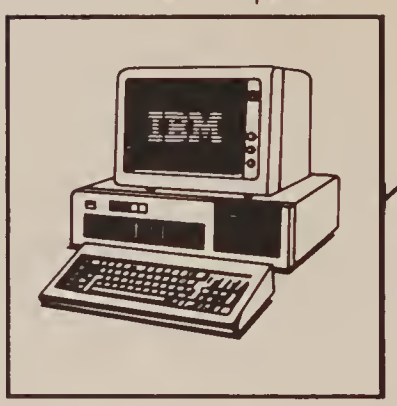

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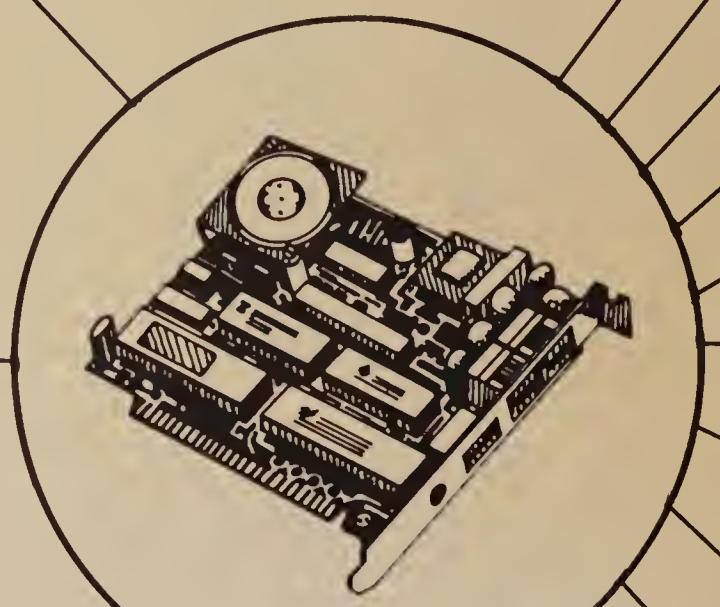

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COMMUNICATIONS

Charity gets Token-Ring

By Peggy Watt

OAKLAND, Calif. — One of the early IBM Token-Ring systems to be installed in the field, and among the very first running Novell, Inc.'s Advanced Netware operating system, has been installed at a nonprofit agency in Oakland.

United Way of the Bay Area employees can use the network to access a data base of more than 20,000 small businesses, which will reside on a Novell file server, said Associate Executive Director Jack Healy. Besides keeping lists of names and numbers, the system will help fund-raisers dial potential donors, record their responses and other general information, prepare boilerplate follow-up letters and compile lists of names and donations.

"I think we have a significant new market opportunity, and to get at this market, we need the state of the art of what technology has to offer," Healy said.

The Token-Ring was the local-area network (LAN) of choice because of its high data rate, its ability to handle multiuser data base access without slowing down and its guarantee of longevity as one of IBM's priority products, said Mark I. Freund, marketing director and a cofounder of Interconnect Network Consulting Group of Pasadena, Calif., which provided consulting services to United Way.

The 4M bit/sec. Token-Ring is faster than token bus configurations, which typically support 2.5M bit/sec. data rates, Freund said. And unlike Ethernet systems that use contention-based network access methods, the token-passing network does not suffer from response-time degradation during peak traffic periods, he added.

IBM's endorsement of the token-passing ring ensured its continued availability and development, Freund noted. Also, United Way felt that with its existing installation of a System/38 and approximately 40 stand-alone Personal Computers, it was already committed to IBM products, he added. "Picking the IBM-endorsed LAN ensured future compatibility with other IBM offerings."

The System/38, with a few remote PC connections, helps track United Way's more than 100,000 area donors, said Doug

See **CHARITY** page 20

AT&T to sell ISDN chip

Unite follows 2B + D, data link control protocols

By Elisabeth Horwitt

BERKELEY HEIGHTS, N.J. — AT&T Technology Systems recently announced the commercial availability of Unite, a chip that can be incorporated into communications boards that interface digital telephones, terminals and personal computers with an Integrated Services Digital Network (ISDN).

The chip implements 2B + D, the ISDN standard that specifies two 64K bit/sec. channels for digitized voice and data transmissions and a separate 16K bit/sec. channel for control signals. The chip has the built-in capability of formatting data according to High-Level Data Link Control protocols, AT&T Technology spokesman Tom Gates noted.

Samples of the chip are now being released to vendors of private branch exchanges, terminals and other computer equipment, Gates said. "We've been accused in the past of withholding our higher level technology. This shows that we are not jealous of our work." The chip also is being designed into AT&T products, he added. Based on the typical six- to nine-month life cycle of board-level products, ISDN interfaces based on the Unite chip should be almost a year away, according to Gates.

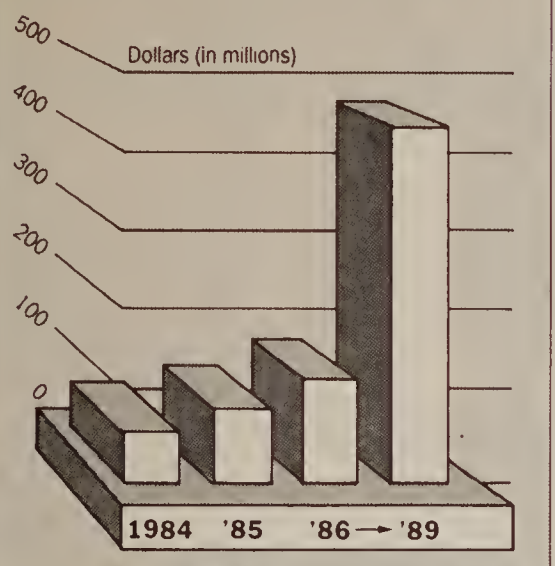
Workstations equipped with different vendors' ISDN boards may not be able to communicate, at least initially, Gates admitted. "Some vendors are offering 2B + D interfaces that do not entirely conform to the ISDN standard. The Consultative Committee on International Telephony and Telegraphy is trying to mesh the different versions, but that is a goal, not a fait accompli."

DATA VIEW

MITCHELL J. HAYES

Factory local-area networks

Installations expected to climb at a steady 35% per year rate through 1989.



Information provided by Frost & Sullivan, Inc.

Bridge software spans PC, TCP/IP gap over Ethernet

By Elisabeth Horwitt

MOUNTAIN VIEW, Calif. — Software recently introduced by Bridge Communications, Inc. enables IBM Personal Computer users to communicate over an Ethernet network with any other system running the Transmission Control Protocol/Internet Protocol (TCP/IP).

TCPTerm is an IBM PC implementation of TCP/IP, a set of basic networking functions that are reportedly supported by approximately 50 network and computer vendors. PCs running TCPTerm can exchange files or communicate in host-to-terminal mode with computers running TCP/IP, according to Bridge President William Carrico.

TCPTerm also provides access to Bridge network servers and gateways running TCP/IP. The product's network manage-

See **SOFTWARE** page 22

INSIDE

Codex introduces a low-end network management system/**22**

NEW THIS WEEK

- Integrated Telecomputing Systems offers the Advanced Messaging System
- For more on this and other new products, see pp. 67-75.

INSTANT ANALYSIS

At Cebit, a computer industry conference held in West Germany this spring, attendees came up with a brand new interpretation of the acronym for Integrated Services Digital Network (ISDN): IBM Schafft Das Nicht, or IBM doesn't make it.

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Charity gets Token-Ring

-From page 19

Rost, system manager, whose six-member staff will begin support of the new Token-Ring network as soon as the consultants move out and day-to-day operation begins.

The company has tentative plans for hooking its System/38 to the Token-Ring. Though a connection would require file conversion, Freund advised United Way that IBM will probably provide such capability.

Freund suggested that United Way use the Novell 109M-byte Novell T286B file server and Novell Netware operating system on the Token-Ring, rather than IBM's own Netbios network system and dedicated PC AT file server, which is less efficient and slower, he said. "Novell's is a more powerful file server than they need now, but when it comes time to add nodes, they should notice no degradation on the system."

United Way's decision to use Novell was reinforced by IBM's recent announcement that it would offer Netware Version 2.0 as an option bundled with its networks. Novell's updated Version 2.0A of Netware supports the Token-Ring, Freund said.

Another benefit of using Novell's file server is that it will easily evolve and expand with United Way's networking needs, Freund said. The server supports as many as four networks. Netware runs on a variety of LAN products and supports "virtually any PC software package," Freund said. "If, in the future, United Way wants a couple of PCs or a minicomputer on Ethernet or some other network to have access to the data bases available on the Novell server, their users will be able to use the same software and commands as users on the original network."

Novell also provides a remote asynchronous gateway that allows remote PCs to tap the new data base by linking into the Token-Ring LAN over phone lines, Rost said.

United Way's initial configuration consists of four 640K-byte Model 2 PC XTs with a total system cost of about $45,000.

Application software

For its application software, United Way chose an integrated package, Executive Management Information System, designed for telemarketing by Peerless Software, a division of Peerless Technology Corp. of San Antonio, Texas. Because the package was already running at both Novell and IBM Token-Ring installations, it was almost certain to run on a network combining the two, Freund said. Initial snags in installing the application on the network were attributed to minor system call changes Novell made in upgrading to the Token-Ring, he added.

All the organizers said there was no problem getting Netware and the IBM Token-Ring hardware to communicate. However, being a pioneer in the still-new IBM Token-Ring world was not without challenges. Freund said he scrounged IBM network cards from several different dealers since they were not yet widely available. He was forced to install the LAN without benefit of documentation.

The new network fits into what a United Way spokesman calls "probably the most automated United Way offices in the country." Throughout the five-county area served by United Way of the Bay Area, 100 employees currently have access to data residing on the network.

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Codex introduces low-end network management system

Monitors modems on nets of up to 248 lines

By Stanley Gibson

MANSFIELD, Mass. — Targeting the low-end network management market, Codex Corp. recently introduced the 4840 Network Management System, designed for networks of up to 248 lines. The new system, incorporating the Data General Corp. MV/2000 DC 32-bit minicomputer, is the smallest of the vendor's 4800 family of network management offerings.

The 4840 is a dedicated system that monitors and does diagnostic testing of Codex modems. A built-in alarm system notifies operators of network problems and deterioration of circuit quality according to user-defined parameters.

The system can activate analog or digital diagnostic tests for up to four remote or central sites. In conjunction with the 4840, Codex 2600 series modems can adjust their transmission rates in response to fluctuating line conditions, Codex said.

Management software

A management reporting software package called Codex Management Applications (CMA) is an optional 4840 feature. CMA provides reports that help management identify network trends, evaluate system performance and assist in future planning, according to Codex.

McCormack & Dodge Corp. became a beta-test site for the 4840 because "we were looking for a mid-price system that would offer network control," said Mike Lake, technical manager for data communications at McCormack & Dodge.

Lake said he was attracted to the larger 4800 series products, but they were too large for McCormack & Dodge's network.

The software systems firm uses the 4840 in a network that offers remote product demonstrations to nine customer education and demonstration centers around the country.

The 4840's monitoring and diagnostics help ensure that the software demonstrations do not develop problems due to network glitches, Lake said.

The CMA package allows network operators to identify and remedy potential trouble spots before they become serious, he added.

Menu-driven program

In addition, Lake praised the CMA package's menu-driven program, which allows employees who are not highly trained network managers to use the system. He said this feature is particularly needed in McCormack & Dodge's network, in which a computer operator, rather than a network manager, is normally in charge of the system.

The other 4800 products, the 4850 and 4860, were designed for networks of up to 496 lines and up to 744 lines, respectively. All 4800 Network Management Systems are software compatible.

The 4840 system is priced at $44,500, and the Codex Management Applications software package is priced at $2,000. Both are available within 60 days of receipt of order, according to Codex.

XEROX

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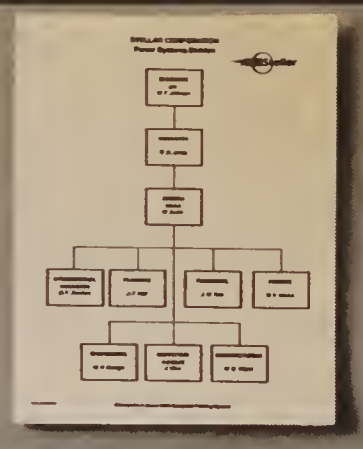

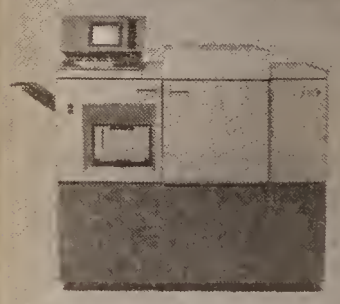

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What's more, while you save time, you also save money.

The 4060 is competitively priced with line printers, but the total operating costs can be much less. And although the 4060 is extremely reliable, there's the added bonus of the most responsive service and support group: Team Xerox.

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Software spans PC, TCP/IP gap

From page 19

ment capabilities include the generation of user audit trails for accounting and security purposes.

TCPTerm interfaces directly with IBM PC-DOS. Carrico said Bridge is currently considering a new release of TCPTerm that would link TCP/IP to Netbios, IBM's widely supported interface for network applications. A link between TCP/IP and Netbios would permit direct communication between an application on the IBM PC and an application on another networked system, he noted.

TCP/IP networking products from Bridge and several other vendors enable a wide range of user systems to run applications on Cray Research, Inc. hosts residing at Minnesota Supercomputer Center, Inc. Many of the Minneapolis time-sharing company's customers are research and academic institutions that use Arpanet, the Department of Defense network for which TCP/IP was originally designed.

"We like TCP/IP because it is an open protocol, because it is a government-supported protocol and because it is used on a wide number of systems," said Robert Williams, Minnesota Supercomputer executive vice-president.

The company currently has IBM PCs doing file transfer and terminal emulation across the TCP/IP network, but it would like the higher level communications capabilities that a Netbios-to-TCP/IP link would provide.

"The IBM PC user should be able to do his number crunching on the Cray, then use the results in a local PC program," Williams said.

Available now, TCPTerm is priced at $300 for the single-user version.

SOFTWARE & SERVICES

SOFTALK
Charles Babcock

Firm quietly making move

Martin Marietta Data Systems, Inc. in Princeton, N.J., is an outfit that few people in DP have had much cause to consider.

We know Martin Marietta Corp. as a builder of missiles, defense-oriented electronic systems and the external fuel tank on the space shuttle. But what does the company have to do with mainstream DP?

As you may recall, the parent company has acquired two noted software companies: Mathematica Products Group, Inc., the originator of the Ramis II information center management system, in 1983, and Oxford Software Corp., producer of the UFO application development system, in 1985. Since then, Martin Marietta Data Systems has been attempting to fold these two firms and their products into its product line.

Being acquired by a $4.4 billion corporation is no guarantee of success for a small software company's product line. On the contrary, software development is such an individual thing that the imposition of a strong corporate environment may have a detrimental effect. So where is Martin Marietta going with these two acquisitions?

In mid-May, Martin Marietta released an update of Ramis II that offered multiple users the ability to simultaneously read and update files and data bases. The difference between this concurrency and the one-user-at-a-time product was great enough that "every line of code in Ramis has been replaced," except for the basic infrastruc-

See **FIRM** page 27

Babcock is Computerworld's *senior editor, software & services.*

Software consultant finds development tools lacking

By Charles Babcock

John B. Landry III, a man regarded as a leading practitioner of software development, says the software industry is going through a "rebirth of development technology."

The ability to embed expert systems in commercial applications opens the door to new software development possibilities, Landry says.

Landry, developer of McCormack & Dodge Corp.'s trendsetting Millennium series and now chairman of Distribution Management Systems, Inc., a Lexington, Mass., applications firm, was hired as a consultant to ADAPSO to report on directions in software development. The report is the first in a series to the 800 software and service firms in ADAPSO and is intended to help them in their own development efforts.

Landry says expert systems need to fit into the IBM mainframe environment to be adopted in commercial systems. IBM's SQL, which is emerging as a de facto standard, provides a common data manipulation command set for future applications, he adds.

While LISP and Prologue, the typical expert system languages, do not run on IBM mainframes, rules-based programming systems that do fit into commercial mainframe environments are on the horizon, he writes.

IBM announced VM/ES for developing expert systems under VM/CMS. Digital Equipment Corp. is expected to announce a shell system later this year, Landry says, and his own company will offer a shell product this fall that will allow expert systems using SQL commands to be embedded in applications.

These approaches not only result in in-

See **CONSULTANT** page 26

SOFTWARE NOTES

Goldman named CEO of AI firm

Robert Goldman, former president of **Cullinet Software, Inc.**, joined the **Artificial Intelligence Corp.** (AIC) of Waltham, Mass., last week as president and chief executive officer. The firm is the producer of **Intellect**, the natural language query system marketed by IBM and Cullinet, among others.

"All the work being done in expert systems is being done with LISP and Prolog. Nobody has attacked expert systems from the IBM mainframe side," Goldman maintained. Unlike many other AI firms, AIC has built interfaces to the main IBM environments, he said. Goldman resigned his position at

See **NOTES** page 27

Manufacturing modules debut

By Stanley Gibson

NATICK, Mass. — McCormack & Dodge Corp. released the first three in a series of eight upgraded manufacturing modules for its Production and Inventory Optimization System (PIOS).

The software was designed to run on Digital Equipment Corp. minicomputers using DEC's Application Control Management System/Terminal Data Management System (ACMS/TDMS) transaction processing system. The previous version had worked with DEC's Forms Management System (FMS).

"Most of the ACMS changes are transparent to the user," said James Koren, who is in charge of implementing the system at Infotron Systems Corp. in Cherry Hill, N.J. He said the version would allow him to cut data entry time in half.

See **MANUFACTURING** page 27

INSIDE

IBM announces a System/36 manufacturing application with host support/**26**

NEW THIS WEEK

- Sun Microsystems offers Autocad on Sun 3 workstations
- Venturcom's Prelude information management system now supports Unix

■ For more on these and other new products, see pp. 67-75.

INSTANT ANALYSIS

"This period in DP history will be remembered as the rebirth of software development technology. The last major renewal occurred with the acceptance of online transaction processing and nonrelational DBMS systems."

— John Landry in the ADAPSO report, "Software Development Technology"

With ORACLE version 5, you save half the computer you thought you needed in order to "go relational"... some benchmarks indicate you save even more.

GET HALF-A-COMPUTER FREE WITH ORACLE VERSION 5

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□ REASON #1: AI OPTIMIZES QUERY PROCESSING.

V5 applies artificial intelligence to SQL query optimization. For example, few DBMSs can optimize the query "Select accounts 90-days overdue **and** accounts over $10,000." But only ORACLE can optimize "Select accounts 90-days overdue **or** accounts over $10,000."

□ REASON #2: ARRAY PROCESSING OPTIMIZES ACCESS TO LARGE SETS OF DATA.

Relational DBMSs have always dealt with **logical** sets of data. But they manipulated only one **physical** record at a time. V5 eliminates overhead by physically delivering arrays of hundreds, even thousands, of records at a time.

□ REASON #3: PARALLEL-PROCESSING OPTIMIZES COMPUTER RESOURCE USAGE.

V5 is 100% re-entrant shared code, and ORACLE's parallel-processing architecture fully exploits modern dyadic and quadratic processors from IBM, and other multi-processing computers such as those from DEC and Stratus. So ORACLE uses all the MIPS in parallel-processor configurations.

□ REASON #4: MULTI-TABLE CLUSTERING OPTIMIZES JOINS.

ORACLE stores data from different tables on the same physical disk page. This technique—called *multi-table clustering*—permits you to access data from multiple tables in one disk read operation. Clustering improves ORACLE performance on all multi-table operations, such as join queries, update transactions, etc.

□ REASON #5: HIGH-SPEED RELATIONAL SORT FACILITY OPTIMIZES DATA AGGREGATION

Ad hoc relational queries frequently request that data be grouped, ordered or otherwise sorted. V5's internal sort facility performs aggregation and elimination early, faster than previously thought possible.

□ REASON #6: EFFICIENT ROW-LEVEL LOCKING OPTIMIZES TRANSACTION THRUPUT.

Row-level locking and a read-consistency model optimizes ORACLE V5 transaction concurrency. For the first time, high transaction thruput is achieved by a fully relational DBMS.

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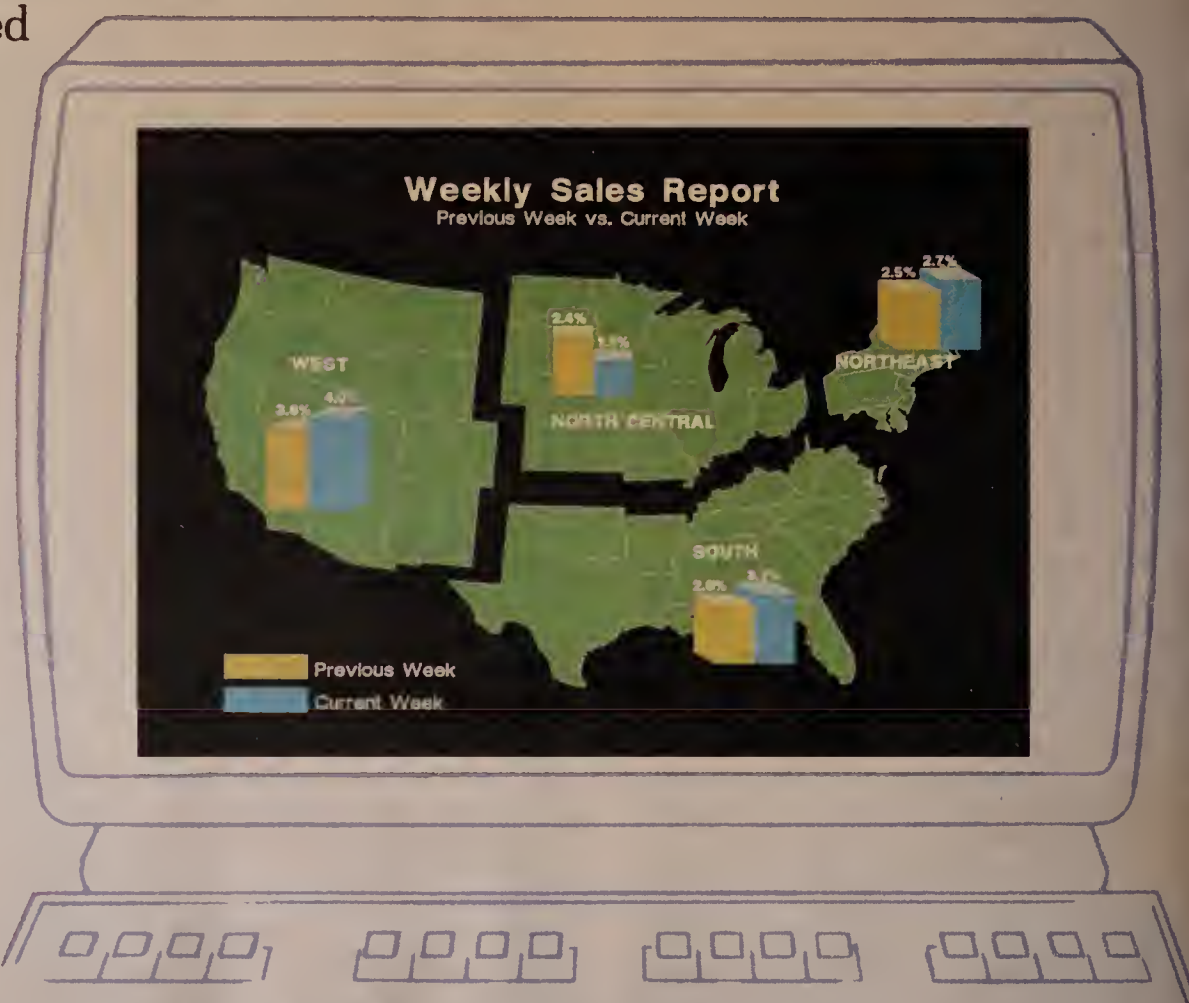

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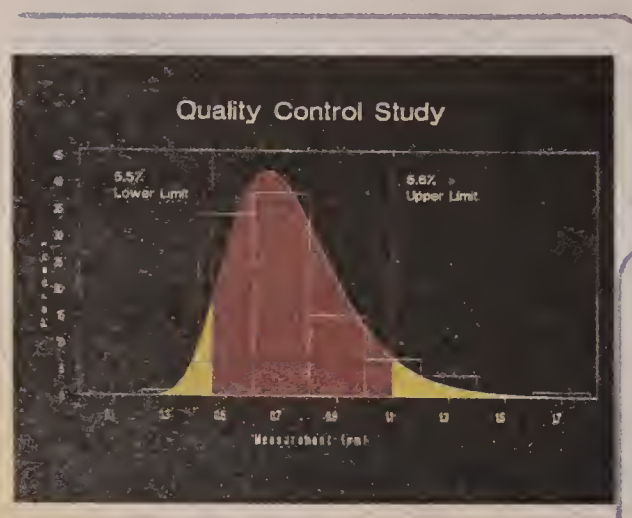

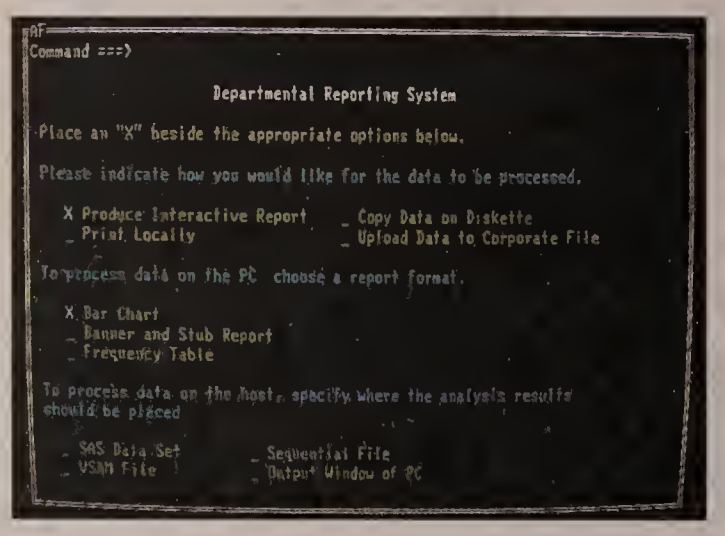

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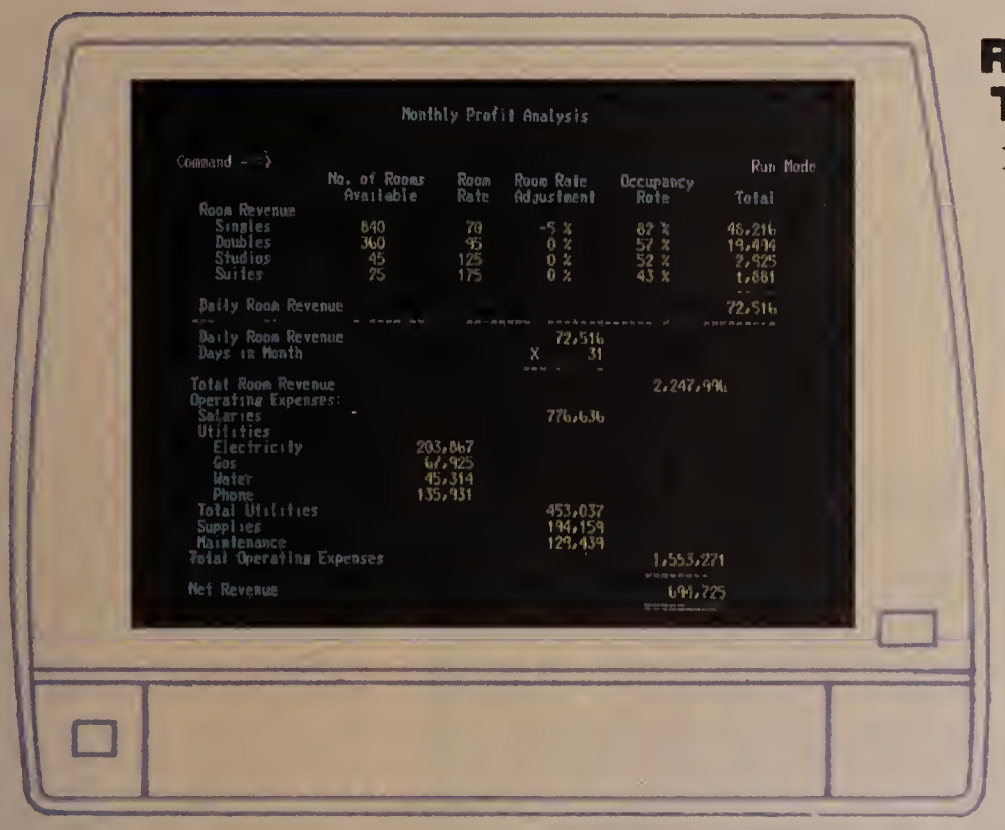

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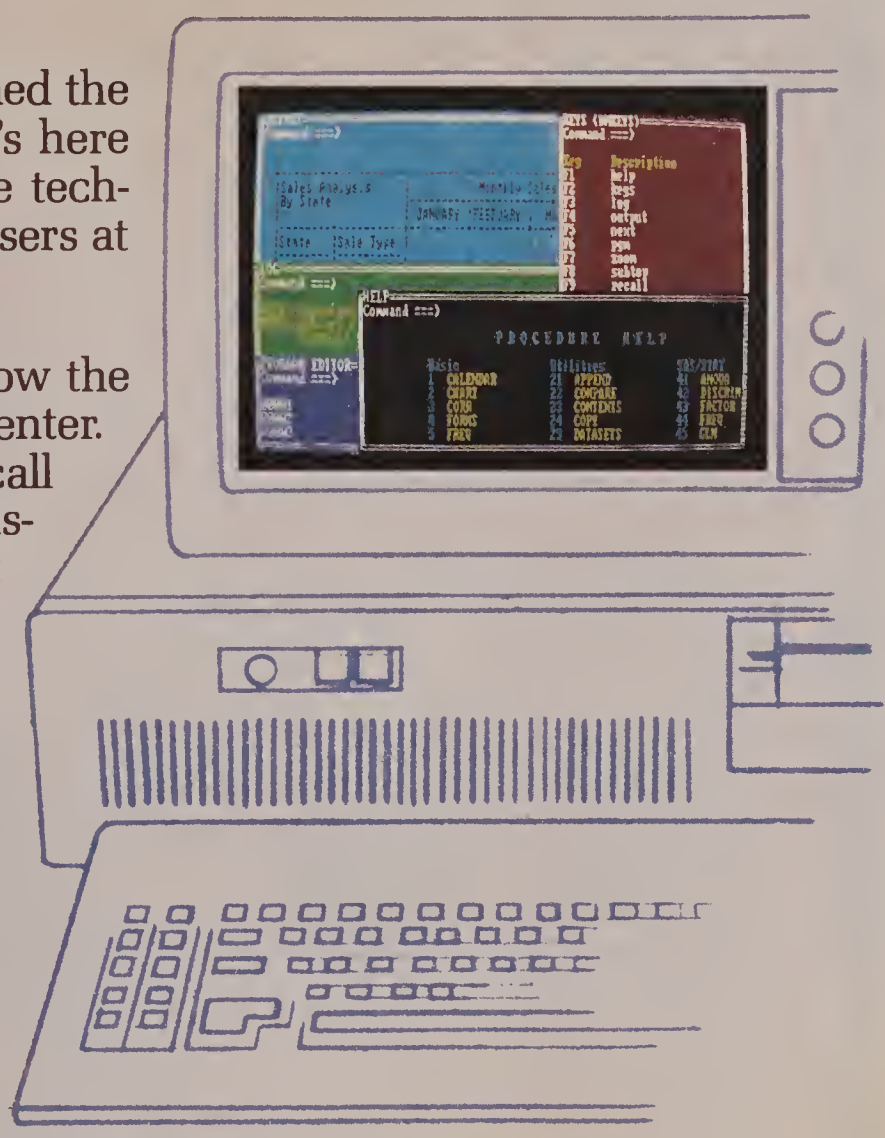

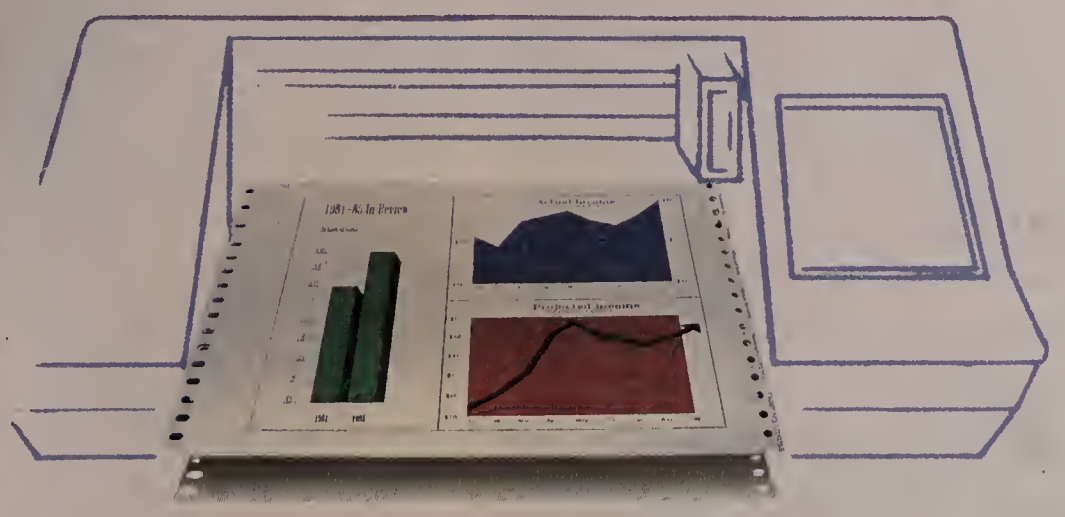

The SAS System runs on IBM 370/30xx/43xx and compatible machines under OS, TSO, CMS, DOS/VSE, SSX, and ICCF; on Digital Equipment Corp. VAX™ 8600 and 11/7xx series under VMS™; on Prime Computer, Inc. Prime 50 series under PRIMOS®; on Data General Corp. ECLIPSE® MV series under AOS/VS; on IBM AT/370 and XT/370 under VM/PC; and on IBM PC AT and PC XT under PC DOS. Not all products are available for all operating systems.

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System/36 shop floor aid out

Tracks manufacturing employee, job status

WHITE PLAINS, N.Y. — IBM announced a System/36 manufacturing application, Production Monitoring and Control program (PM&C), for tracking employee status and the status of jobs on the shop floor.

Using data collection terminals on the shop floor, employees clock on and off jobs, move materials and report activity to PM&C.

The system then analyzes the status of jobs, work centers and employees for up-to-date reports, according to IBM.

"The shop floor can be more easily controlled, since problems can be identified and resolved as they occur," IBM spokesmen said.

Written in RPG-II

Written in the System/36 programming language, RPG-II, it is available immediately for $3,600.

IBM also announced host support for the exchange of information between PM&C and as many as five MAPICS II applications.

MAPICS, for Manufacturing, Accounting and Production Information and Control System, is IBM's manufacturing system. Host support is available immediately for $360, IBM said.

Consultant finds tools lacking

From page 23

telligent, workhorse applications but also combat a number of traditional development problems.

The typical development process, he charges, has too many people, too many different modes of expression — from English specifications to flow charts to program code — and too little user feedback.

With four people working on a project, there are 12 communication paths and that many potential avenues of misunderstanding. With 32 people, there are 992 communication paths and that much greater potential for error.

To combat these deficiencies, he recommends automating the system building process as much as possible, shortening communication paths, improving communication vehicles and integrating the development tools into a common system. In addition, software developers should seek a development environment that leads to applications that are both portable and efficient.

Working with advances in third-generation languages, such as structured Cobol or reusable code, does little to solve the communications problems in the system analysis and design stages, he notes.

Fourth-generation technology includes fourth-generation languages, applications development systems and application generators. Each offers advantages over third-generation languages, but none meets all six goals named above.

IBM's fourth-generation language, Cross System Product, provides a tool kit to develop applications across the major IBM operating systems, thereby offering portability. It also has a component that will automatically optimize system performance after the application is created.

Also available are such development systems as Millennium SDT, UFO from Oxford Software Corp. (now part of Martin Marietta Corp.) and Gener/ol from Pansophic Systems, Inc.

Millennium SDT is the set of tools Landry used to develop the Millennium series. Management Science America, Inc. and Software International Corp. have brought out similar tool sets for their integrated, application series.

IBM's Cross System Product and other tool sets still leave the design phase underautomated, he notes, but they allow developers to quickly build prototypes that can be fleshed out into applications. The design becomes the application, "reducing communication paths and providing consistent tools for representation," he said.

Application generators

Another fourth-generation technology, applications generators, are expensive — $100,000 to $200,000 — but can convert design specifications into prototypes and generate the production application. (This week's Product Spotlight focuses on applications generators, beginning on page 39.) Examples include Pansophic's Telon, Sage Systems, Inc.'s APS, CGI Systems Co.'s Pacbase, Higher Order Software, Inc.'s Use-It and Tarkenton Software's Gamma.

These systems automate the design and coding process, Landry writes, but the ability to develop prototypes "is constrained by the amount of detail required in the design specification."

In the hands of skilled developers, fourth-generation languages combined with data base management systems allow applications to be created more quickly, often through prototyping that allows prompt user feedback. Furthermore, the prototype can be fleshed out to become the system, "reducing communication paths and providing consistent tools for representation."

But experienced users of fourth-generation languages are rare. In the hands of a poor developer, they create "a lousy system but much more quickly," he writes.

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Firm quietly making move

From page 23

ture, says Donald R. Shaw, vice-president and general manager of Data Systems.

Over the last few years, Ramis II has been dropping back in second place to its primary competitor, Information Builders, Inc.'s Focus. Obviously, Martin Marietta was not satisfied with that position.

The rewrite process opened up the opportunity to coordinate the operation of Ramis with other parts of Data Systems' product line. Its manufacturing applications, Modular Application Series (MAS), have been revamped, and their files are now accessible to a Ramis II user. In a similar vein, Data Systems' accounting applications, which sell mainly to large manufacturing installations, are integrated with MAS in their current, controlled release.

One can sense a powerful realignment taking place here. Manufacturing software is one of the growth areas of the industry; manufacturers, such as the auto makers in Detroit, have been automating with a vengeance since the back-to-back recessions of 1980 and 1982, and their appetite for software has only been whetted by their early success.

So what happened to Oxford Software's UFO? It has been folded into a new Data Systems product, Consensus, that packages a version of Cobol, a nonprocedural fourth-generation language, and UFO together into a shared application development environment. The Cobol language offered is the one familiar to standard Cobol programmers, but its use of interactive screen painting facilities enables a Cobol programmer to develop CICS applications without further training.

There isn't space to discuss the initiatives Data Systems is launching in microcomputer software as well. Suffice it to say it has some of the same underlying goals: "We are trying to find a scheme that enables us to capitalize on the recognition of old products and at the same time create a new family structure," Shaw says.

The revamped manufacturing applications are sitting atop a unifying architecture, "a kind of meta operating system," that not only ties together applications but also provides interfaces to different forms of hardware. Other companies are moving in the same direction, but Martin Marietta at least has the advantage of having arrived late and chosen this direction early.

Manufacturing modules debut

From page 23

Koren also said he anticipates benefits from the ACMS/TDMS version's ability to support a large number of concurrent users. With the FMS system, 40 users can log on to PIOS from any of the 650 terminals attached to Infotron's cluster of seven DEC VAXs. The ACMS/TDMS version will allow several hundred users to log on to PIOS simultaneously.

The software was developed in accordance with McCormack & Dodge's agreement with DEC to stay in step with DEC's own software improvements, according to Jack Knapp, McCormack & Dodge marketing manager. Knapp said the ACMS/TDMS version is also 35% to 40% faster than FMS and contains improved security features, among other enhancements. The 11 current users of the FMS version of PIOS are upgrading to the new ACMS system, he said.

The three PIOS/ACMS modules available immediately include bill of materials, material requirements planning and inventory control. Two more modules will be available in the next month or so, and the remaining five reportedly will be available before the end of the year. Each PIOS module is priced at $25,000; existing customers may trade in FMS modules for ACMS/TDMS versions.

PIOS was developed by Rath & Strong Systems Products, Inc. of Dallas, which was acquired by McCormack & Dodge in 1985.

Notes: AMS buys Anacomp line

From page 23

Cullinet March 12 upon the appointment of David Chapman as Cullinet's new vice-chairman and CEO.

■

American Management Systems, Inc. (AMS) has acquired the **Bankserv** product line of **Anacomp, Inc.** of Indianapolis. The line includes six credit management systems for banks, including the Installment Loan System, one of the most widely used loan packages.

■

Information Builders, Inc. is offering an $8,500 interface from **Focus** to **Datacom/DB**, the relational data base management system from **Applied Data Research, Inc.** It will permit a Focus user running under MVS/TSO to use Focus reporting and data analysis functions against data in Datacom/DB, Information Builders officials said.

■

Burroughs Corp.'s Linc, also known as the **Logic and Information Network Compiler**, now runs on its **XE 550** Unix-based superminicomputer. The system is able to generate applications that run on Burroughs' B1000 through B7000 series, V and A series and the supermini, Burroughs said.

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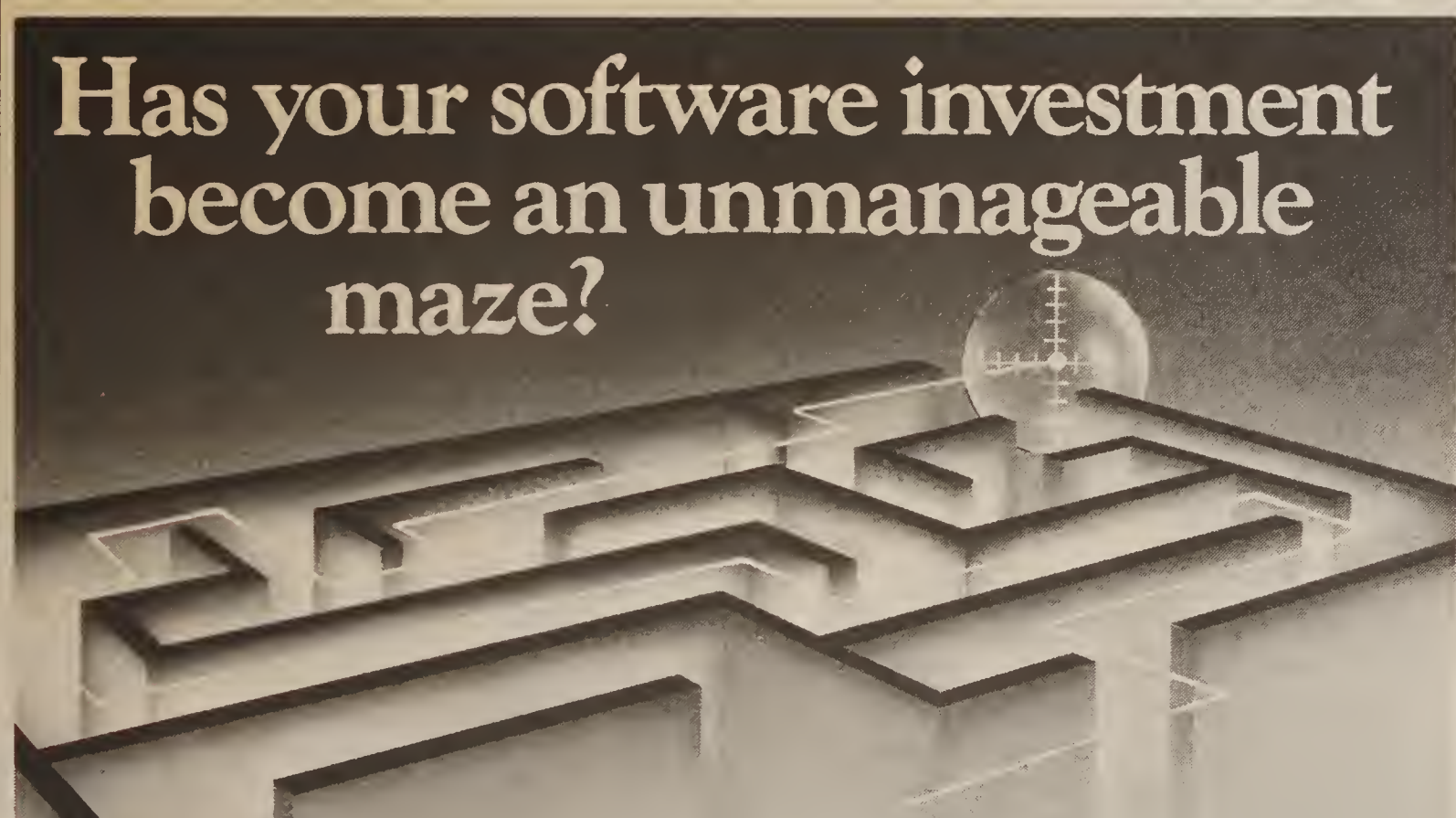

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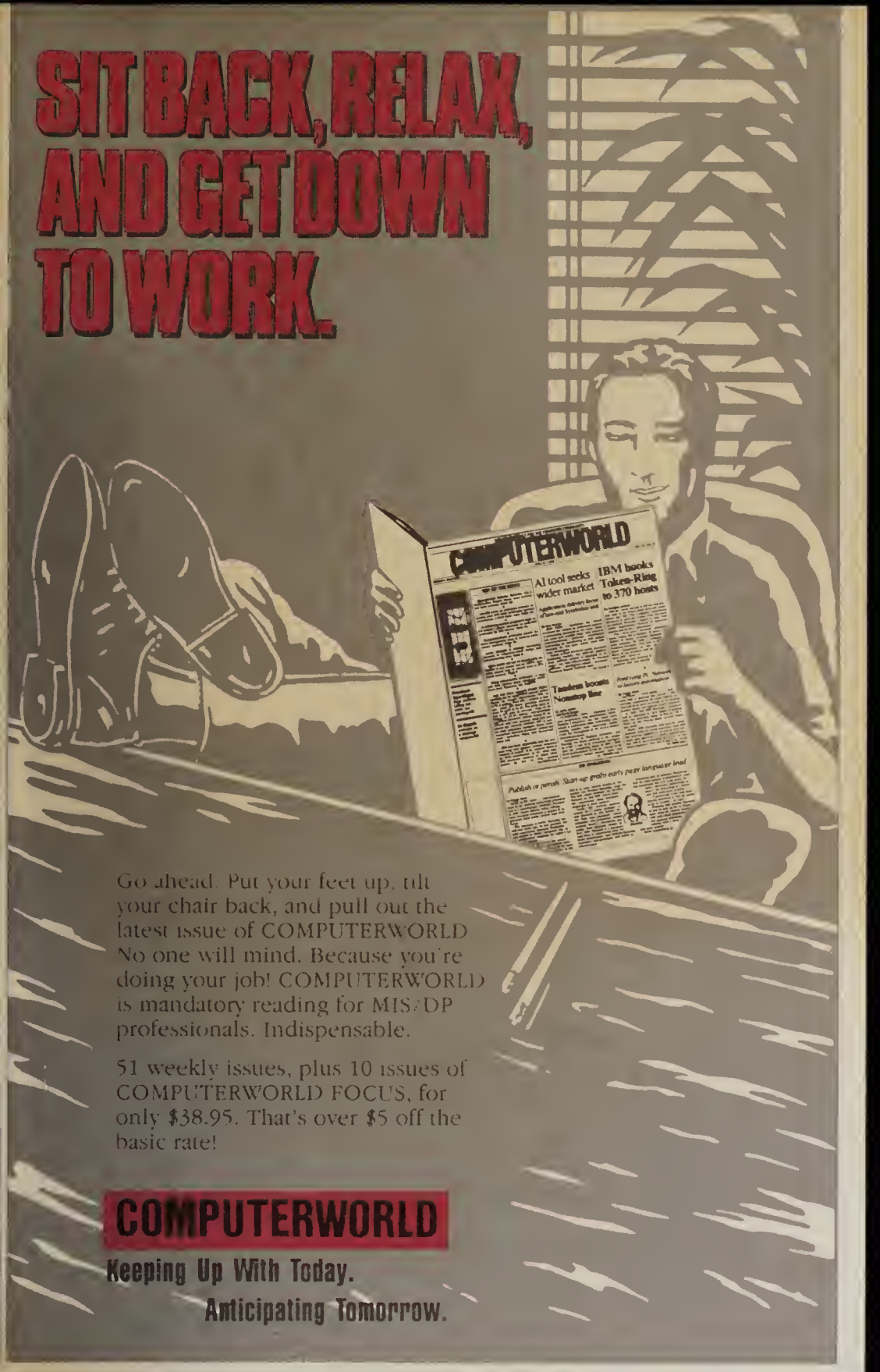

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MICROCOMPUTERS

MICROBITS
David Ahl

One size never fits everybody

Some people paint pictures. Others jog to work. I build shelves.

On cleanup days, most of my neighbors put out tons of trash. I throw away maybe one bag.

All of which is to say that I am an accumulator, a saver, a collector.

I don't know when it started. Probably when I was born. Maybe before. And as the years passed, this passion for collecting grew — to stamps, first-day covers, coins, comics, magazines, records (I have the first RCA 33-rpm long-play record ever made), neckerchief slides, puppets, robots and finally to computers.

Recently, a friend of mine mentioned that he had upgraded to an IBM Personal Computer and was selling his Tandy Corp. TRS-80 Model III — actually, two of them — and was I interested? Since I still use a Model III for word processing, I was sorely tempted. I already had three Model IIIs (one I use, one my kids use and the other is a spare), but he knew that I had long ago concluded that you can't have too many computers, just as you can't have too many screwdrivers or too many RCA-to-RCA phono cables.

This time I resisted — at least temporarily. My house and U-Lok storage locker are already overflowing, and I felt I had to put an end to this mindless accumulation.

I recently filled out a questionnaire from a computer magazine asking what computers I owned. They allowed space for only four computers, not nearly enough for my 22 machines. Do I use them all? Well, not really. (In fact, since many of these companies no longer produce PCs, I didn't bother to decipher the alphabet soup that makes up their

See **ONE** page 33

Ahl founded Creative Computing Magazine *and is the author of more than 20 books on recreational, educational and professional computer applications.*

Microsoft, Intel offer users Xenix 286-Unix migration

By Eddy Goldberg

Intel Corp. and Microsoft Corp. recently announced an agreement that will ensure that users of Microsoft's Xenix 286 will have a place in the growing environment of multiuser, multitasking systems based on the Intel 80386 chip and AT&T's Unix System V.3.

Under terms of the agreement, Intel will include in its System V/386 Unix V.3 derivative the capabilities and features needed to run programs written for Microsoft's Xenix 286.

This will provide users of Xenix 286-based applications with a migration path that will allow the Xenix 286 software base to be merged into the Unix market, according to Leslie Vadasz, senior vice-president and general manager of Intel's Systems Group in Hillsboro, Ore.

The agreement specifically provides for Xenix binary compatibility under Unix V.3-based Intel board and system products. Intel's 80286 and 80386 are the principal processor families affected, and products will include Intel's Opennet local-area network family, its Host Communication Products, Apex multiple processor systems and applications software running on Intel boards and systems.

The System V/386 products are scheduled for availability in mid-1987, according to an Intel spokesman. System V/386 features currently include support for the 32-bit programming model of the 386 chip and demand-paged virtual memory as well as support for the Virtual 86 mode of the processor. This allows Microsoft MS-DOS software running on Intel 8086- and 8088-based systems to run on 386-based products using System/V 386.

Another Unix-DOS development

In another Unix-DOS development, Linkdata, Inc. of Union, N.J., introduced a Unix System V Release 2 version of its MPC/68 coprocessor board that allows IBM Personal Computer ATs and compatibles to support up to 17 users in a multiuser, multitasking system.

The company also expanded the MPC/68 from 512K bytes to 1M-byte, 2M-byte and 4M-byte memory options. The MPC/68's speed has also been boosted from 8 MHz to 10- or 12.5-MHz options.

The memory expansion allows the company's enhanced Motorola, Inc. 68000 coprocessors to support Unix V.2 concurrently with MS-DOS operations. Users can switch between the two environments with a single keystroke, allowing MS-DOS

See **XENIX** page 34

TI develops expert package for PC

System developer aimed at entry-level market

By James Connolly

AUSTIN, Texas — Aiming its expert systems development program at a lower entry-level point, Texas Instruments, Inc. last week introduced a development system designed for use on IBM Personal Computer-class systems.

In addition to announcing the Personal Consultant Easy expert system shell, TI released Version 2.0 of its Personal Consultant Plus, which is the company's year-old system for IBM Personal Computer AT-class machines.

Personal Consultant Easy includes the basic functions of Personal Consultant Plus 2.0 and allows the novice user to develop small to medium-size expert systems, according to Mark Linesch, TI's product marketing manager for the Personal Consultant series. "Personal Consultant Easy allows quick prototyping for the newcomer and power for the experienced user," Linesch said.

Linesch emphasized that systems developed with Personal Consultant Easy are compatible with Personal Consultant Plus 2.0 and TI's high-end Explorer Lisp-based symbolic processing system. Personal Consultant Easy supports knowledge bases of up to 640K bytes of random-access memory (RAM), rule-based applications and graphics using TI's version of the IBM Enhanced Graphics Adapter (EGA). It includes data import facilities for Microsoft Corp. MS-DOS files and Ashton-Tate DBase II, III and III-Plus inquiries.

Personal Consultant Plus 2.0 supports up to 2M bytes of RAM and features new development capabilities like frame description, which allows the user to break

See **TI** page 34

INSIDE

Mouse Systems Corp. is set to announce a PC Mouse version that provides a dedicated mouse port/**34**

NEW THIS WEEK

- Tandy offers the 102 portable computer
- Comark Corp. announces the Expert-AT workstation

■ For more on these and other new products, see pp. 67-75.

INSTANT ANALYSIS

"By and large, IBM would not want to come out with a 386 machine until probably 1988, because it tends to milk product life cycles."

— Jan Lewis, president of the Palo Alto Research Group, on IBM's plans for a more powerful personal computer

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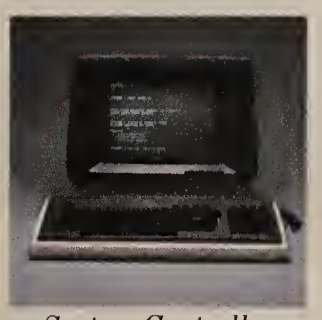

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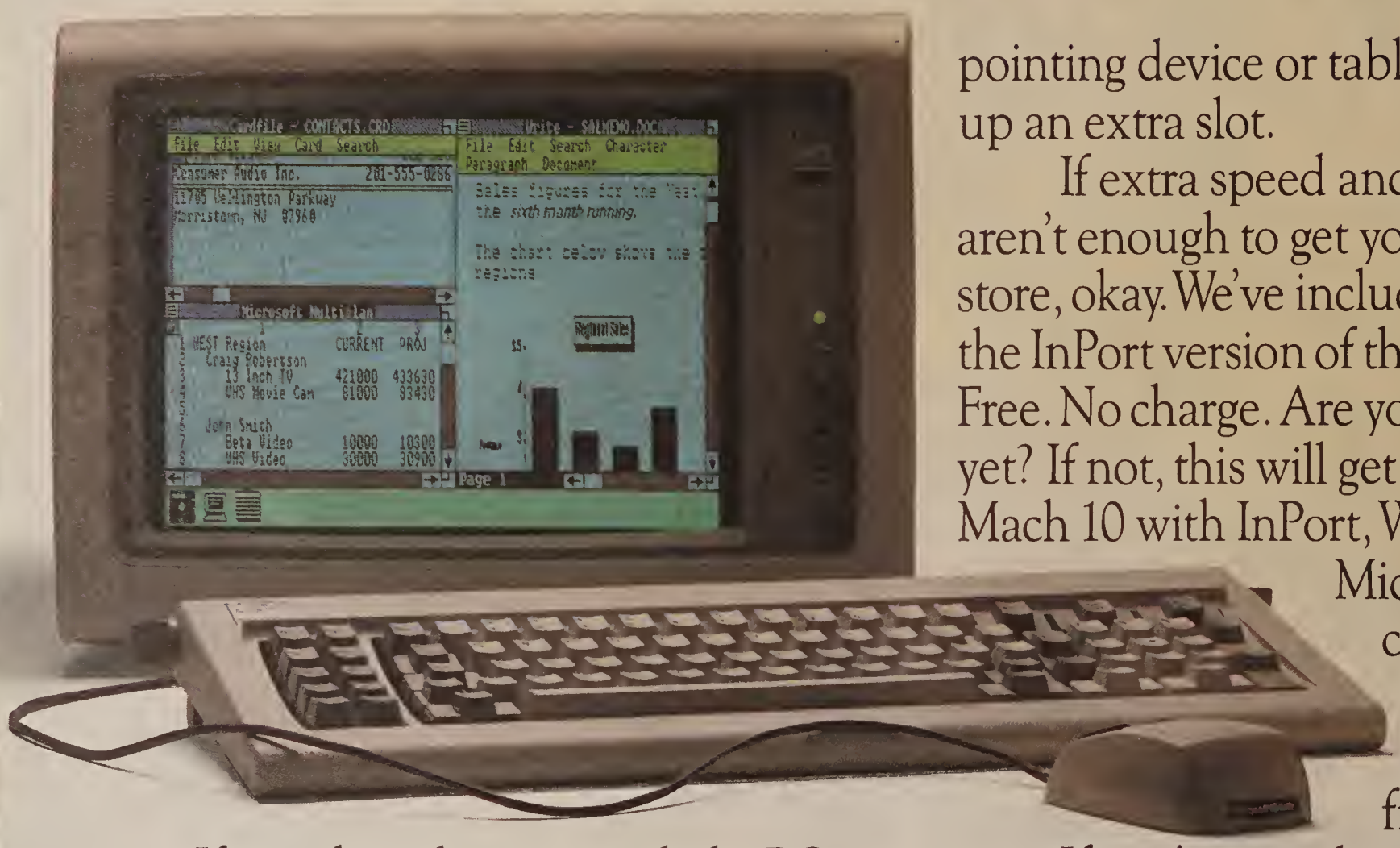

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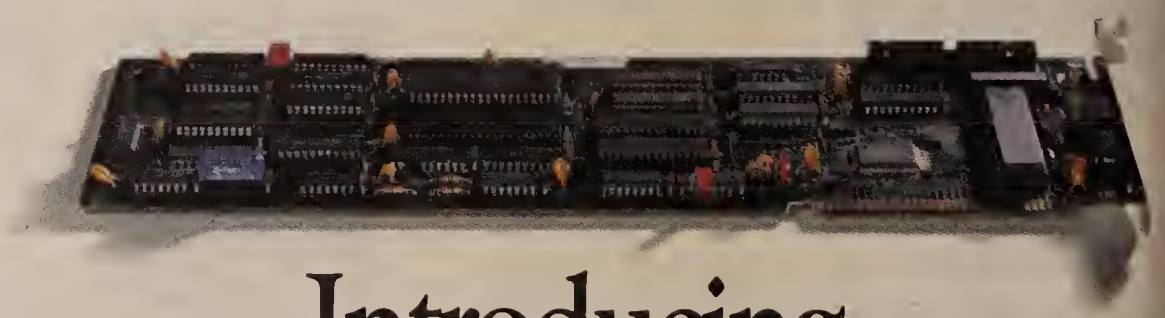

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One size never fits everybody

From page 29

names.) I'm keeping my original S-100 bus Altair, IMSAI, SOL, CSS, and Sorcerer for historical and sentimental reasons. Likewise for my first PET and Texas Instruments 99/4 (with the Chiclet keyboards) and CC40, Sinclair ZX81, and Spectravideo 318.

It was only a short while ago that I retired my 1978 Apple Computer, Inc. Apple II in favor of an Apple IIe. My Atari Corp. 800 is still a terrific game machine; there are some marvelous music programs for the Commodore 64; and the Mac has no equal for page layout.

Several computers are more effective than one general-purpose machine. Sure, I could do all of my personal computing tasks on one computer, but it would be an ineffective compromise.

Which brings me to the point of all this: Several computers are more effective than one general-purpose machine. Sure, I could do all of my personal computing tasks on one computer, say an IBM PC XT or clone. But it would be an ineffective compromise.

For spreadsheet and data base applications, it would be fine. But for word processing, it would be less effective, for I would not have access to hundreds of old disks containing previous articles, memos and notes.

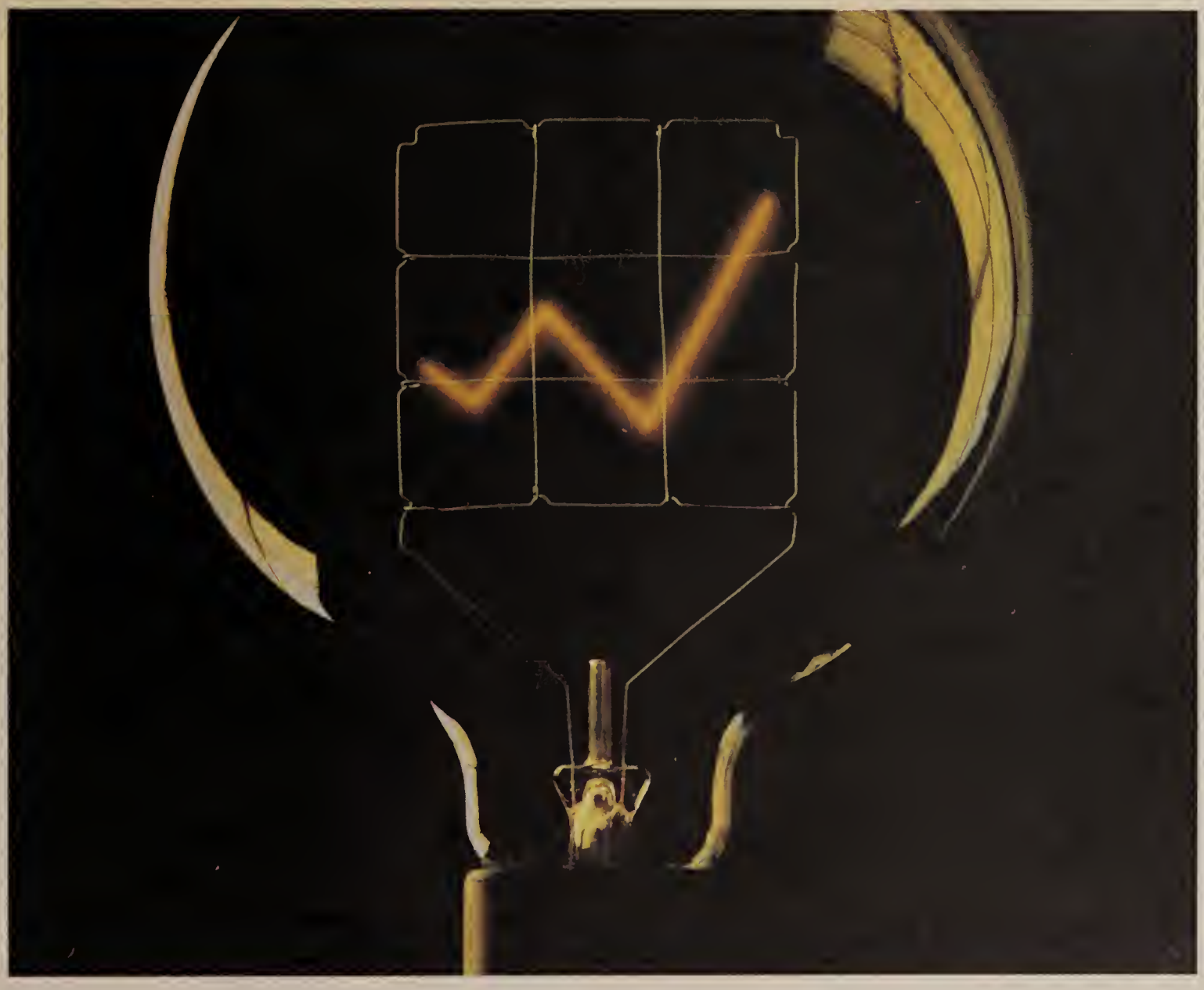
For telecommunications, I sometimes want to use the same computer I use for word processing, but other times, when I am on the road, I want to use a portable like a NEC 8201 or a Tandy Model 200.

For desktop publishing, many packages have been released for the IBM PC, but the Apple Macintosh is still the leader. The page layout packages for it are unequaled, as are the libraries of "clip art."

And since children are among the users of my personal computers, I felt it would be a mistake to not have an Apple II; there are more educational packages for it than for everything else combined.

My computers also serves as a diversion from work, so the scores of entertainment, music and graphics and drawing packages available for the Commodore 64 and Atari 8-bit computers made it essential to have at least one of each machine. Within six months, that will be true of the Atari ST and Commodore Amiga as well.

So the next time your boss says, "You want to buy another *what*?," just wave this column and say, "Well, if *Ahl* has 22 computers, why can't I have just one more?"



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PC Mouse version alleviates need for multifunction card

Provides dedicated port for peripherals

SANTA CLARA, Calif. — Mouse Systems Corp. is scheduled to introduce today a version of its optical PC Mouse that also provides a dedicated mouse port.

With the $199 PC Mouse Bus Plus, users can connect a PC Mouse and peripheral devices to a microcomputer without having to purchase a multifunction card, the firm said. The product also eliminates the need for an external power supply.

Guaranteed for life, PC Mouse Bus Plus includes a PC Mouse and the Bus Plus card, Mouse System's PC Paint Plus business graphics package and Designer Pop-Up Menu software.

With the menu software, the mouse can immediately be used with 13 major application packages, including Lotus Development Corp.'s 1-2-3 and Symphony, Micropro International Corp.'s Wordstar and Ashton-Tate's Dbase III and Framework. The device is said to be fully compatible with all software packages designed for a mouse, including Microsoft Corp.'s Windows and Microsoft Word and Digital Research, Inc.'s Graphics Environment Manager environment, the firm said.

The PC Mouse Bus Plus incorporates a new device driver that the company said gives more flexibility in adding peripheral devices to an IBM Personal Computer. According to the company, the driver frees the standard COM1 and COM2 port addresses, permitting two serial ports and the Bus Plus's dedicated mouse port to function simultaneously.

PC Mouse Bus Plus is currently available.

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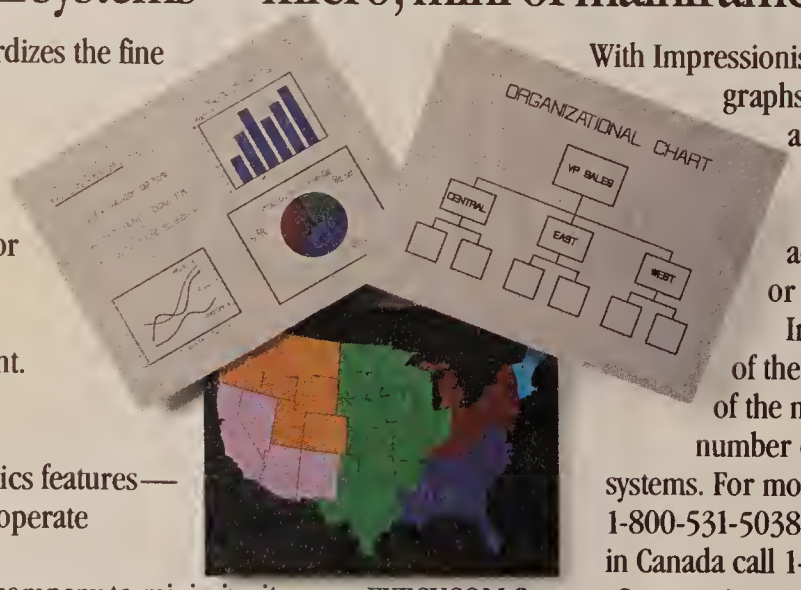

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EXECUCOM

Xenix-Unix migration

From page 29

to run local software while Unix executes applications in the background.

Linkdata is also offering a new front-end processor to provide faster I/O for the Unix systems. An eight-port front-end processor with a 68000 chip is priced at $1,895 and a 16-port version at $3,495.

Under Unix System V, the MPC/68 can run applications written in Digital Equipment Corp.'s VAX Dibol, Digital Information Systems Corp.'s DBL, Ryan-McFarland Corp.'s RM Cobol and the C programming language.

Prices for a 1M-byte, 10-MHz MPC/68 board including a Unix System V license for eight users is $4,495 and is currently available. An upgrade to 2M bytes at 10 MHz costs $2,695 and is available in beta-site quantities.

TI develops expert tool

From page 29

up a problem into smaller and related problems, and meta rules, which tell the user how to best use a piece of information in conjunction with other knowledge.

A runtime option is available for both products.

The products will be available in September. Personal Consultant Easy costs $495. Personal Consultant Plus 2.0 costs $2,950. Runtime diskettes cost $95 or $995 for 20 copies.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

IBM 4300s next in line

Now, eyes can shift to the 4300s. IBM has made its pitch for the new System/36s and 38s and has tried to clarify its strategy for users of those segments of the mid-range lineup. But what becomes of the company's 4361s and 4381s? The answers apparently will be coming within six months, with some signs due as early as September.

The latest reports indicate IBM will introduce its Micro370 microprocessor-based, mainframe architecture small-scale system as soon as next month. That machine is likely to extend downward from the 4361 product line and effectively replace the 4361 as the entry point to IBM's mainframe world.

In addition, the long-rumored CMOS-based replacement for the four 6-month-old models of the 4381 family is drawing closer. Experienced IBM watchers have been predicting that the 4381 replacements will be introduced in February, just one year after the four newest models were announced as mid-life kickers — or late-in-life kickers — this year.

One challenge IBM must address, however, as it turns its attention toward the 4300s and the Micro370, is that it cannot afford to bring back the confusion that has surrounded its mid-range line and left customers wondering if the individual systems to which they had committed themselves fit into

See **IBM** page 38

Connolly is Computerworld*'s senior editor, systems & peripherals.*

DEC cuts IBM CPU share

Study of medium-scale mart also shows supermini growth

By James Connolly

FRAMINGHAM, Mass. — Digital Equipment Corp. continues to make inroads in its fight with IBM for the medium-scale processor market, although IBM's emphasis on selling mainframe-type systems in that market gives it an edge in value of shipments.

That was one conclusion of a recent study of the medium-scale industry by the Framingham-based market research firm International Data Corp. (IDC). The report also predicted that the market for the high-end minicomputer and low-end mainframe systems will grow for the rest of the 1980s, although at a slower annual pace of 9% than the 15% that it grew during the years 1980 to 1985.

In addition, users surveyed by IDC reported that they expect continued growth in their need for superminicomputer processor capacity. In separate surveys, with more than 700 IBM customers responding to one survey and 470 non-IBM users answering another questionnaire, IDC found that most users plan steady growth in CPU demand for the years 1986 to 1988.

For example, only 16% of the non-IBM users and 18% of the IBM customers reported no planned growth in CPU requirements, whereas more than 33% of each group said they expect annual growth in excess of 25%. More than 30% of each group also reported higher than 25% annual growth rates for disk capacity and personal computers.

IDC analyst Richard Mikita said one other key finding of the survey was that the majority of the users said the major bottleneck in a superminicomputer system is disk-access speed rather than CPU speed.

"It is clear that in this medium-scale range, it is the overall system capability,

See **DEC** page 36

Lynk intelligent workstations bow

By Eddy Goldberg

KING OF PRUSSIA, Pa. — The Lynk Corp. recently announced a number of intelligent workstations and printers for the IBM System/36 and System/38 departmental computers, as well as enhancements and price cuts for its IBM 5291-compatible workstations.

Lynk spokesmen described the Computinglynk/I and II as the first intelligent workstations offered for the IBM System/36 and 38. The products are built around Lynk's first product, the IBM 3180-2-compatible Lynkstation/802, which began shipping last December. The 15-in. Computinglynk workstations are designed to combine IBM Personal Computer functionality with a workstation, allowing users to run 3180 programs and use stand-alone personal computing software such as word processing and spreadsheet programs, said Jacob R. Powell, marketing vice-president.

The Computinglynk/I is a "diskless PC" supporting IBM's virtual diskette. It will include Microsoft Corp.'s MS-DOS 3.2 and be available in September for $2,195. A $395 optional 3½-in. disk drive will be available in October.

The Computinglynk/II, in addition to containing the features of the Computinglynk/I, will allow users to add one or two 5¼-in. disk drives and up to four IBM PC-compatible expansion cards. The price for a single-drive model, available in September, is $2,890. Field upgrade kits for existing Lynk workstations also will be available in September.

Lynk also announced that the price for its Lynkstation/912, a 15-in. workstation for the IBM System/36 and 38, has been lowered from $1,525 to $1,395.

See **LYNK** page 38

INSIDE

NCR introduces an enhanced tape cartridge controller/**36**

NCR offers two sets of integrated circuit design tools for Mentor Graphics workstations/**38**

NEW THIS WEEK

- Lattice Logic offers Application Specific Engine Workstation
- Gould, Inc. introduces IP9000 series image processor
- For more on these and other new products, see pp. 67-75.

INSTANT ANALYSIS

"When we have the tax bill behind us, maybe then people will start buying computers."

— William Easterbrook, analyst, Kidder Peabody & Co.

Apollo unveils TOS package

Office system includes publishing software

By Rosemary Hamilton

CHELMSFORD, Mass. — In keeping with its plans to market a series of prepackaged systems, Apollo Computer, Inc. recently introduced a package designed for technical office applications that will include WPS.C, electronic publishing software from Interleaf, Inc.

The Technical Office Support (TOS) system will be offered in a similar fashion to the computer-aided-software engineering package introduced in early July. The two TOS configurations are based on the vendor's low-end workstation — the Series 3000 — and come with Apollo's Domain/IX operating system and DPSS/Mail.

While Interleaf's WPS.C will be a standard part of the package, customers are also provided with discounts ranging from 30% to 40% on four third-party application packages. Additionally, Imagen Corp. will offer its 8 page/min laser printer, Imagestation, at a 20% discount.

The TOS-3000 Starter 5 Pack, which sells for $78,800, includes five Series 3000s, each with 4M bytes of main memory, three 72M-byte disks, a 60M-byte cartridge tape and two floppy drives. The package also has five node licenses for Apollo's DPSS/Mail and Interleaf's WPS.C software.

The TOS-3000 5 Server Pack, which sells for $106,400 and is also based on five Series 3000s with 4M bytes of main memory each, has less disk and tape storage than the Starter Pack but includes a Domain File Server with 442M-byte disk capacity. It has two 72M-byte disks, one 60M-byte cartridge tape and one floppy drive.

Compugraphic CG6000 merges text, graphics via pasteup enhancement

By Eddy Goldberg

WILMINGTON, Mass. — Compugraphic Corp. recently added electronic pasteup capabilities to its Modular Composition System (MCS) product line with the CG 6000, an electronic publishing workstation based on hardware from Sun Microsystems, Inc.

The CG 6000 allows users to merge and manipulate text and graphics to produce fully made-up pages with text, line art and halftones in position.

Up to four Compugraphic MCS or Powerview text input systems can be hooked to the CG 6000 workstation. The text is then merged with digitized graphics from a Compugraphic Scanner 2000, according to the vendor.

Output is on either the Compugraphic 8600 Imagesetter phototypesetter or the Compugraphic 9600 laser output device.

Built on MC68020-based workstations

The CG 6000, built on the Sun-3 Motorola, Inc. MC68020-based workstation, features 1,024- by 1,024-pixel screen resolution, pull-down menus, message prompts and a Help function.

Delivery of the Compugraphic CG 6000 is scheduled for first-quarter 1987.

The price for the CG 6000, Compugraphic Scanner 2000, software, 120M-byte hard disk drive and 45M-byte tape drive for archiving and backing up both text and graphics is $70,000.

According to the vendor, two optional 120M-byte hard disks can be added for a maximum storage capability of 360M bytes.

NCR offers tape cartridge controller for backup

Features 64K-byte buffer, bus sharing

By Stanley Gibson

WICHITA, Kan. — NCR Corp. recently announced a ¼-in. tape cartridge controller for backup and restoration of data from disk to tape. The one-board ADP-55 small computer systems interface (SCSI) to QIC-36 Tape Controller replaces NCR's two-board ADP-54 model.

"We did a redesign on it and, using very large-scale integration technology, got it down to one board," said John Ast, OEM products marketing manager for NCR.

Like the ADP-54, the ADP-55 connects to a 45M-byte or 60M-byte cartridge tape drive using the QIC-36 interface and features a 64K-byte buffer with parity.

The ADP-55 supports bus arbitration or disconnect-reconnect, which allows other peripherals, according to priority, to use the SCSI bus to which the tape controller is connected. Ast noted that the ADP-55 can also do off-line copies and send data to a disk as well as retrieve data.

The new model, available in October, comes in a single-ended version, used with minicomputers and microcomputers, and a differential version, used with mainframes. NCR's suggested retail price is $395 for the single-ended board and $445 for the differential board.

DEC cuts into IBM share

From page 35

not just CPU speed but a really balanced system, that is important," Mikita said, noting that major vendors appear to be addressing the disk-access problem and improving I/O bandwidths through a variety of means while worrying less about hot-box vendors who boast of high CPU speeds.

Mikita said DEC is a threat to IBM and that DEC's single-product-line strategy has brought it up to second place in the medium-scale market in five years. "One of the interesting things is the perception of DEC right now. The perception of many people is that DEC is on a roll, but the underlying thought is that it is a temporary thing and that IBM will regain its dominance," Mikita said.

IDC found that DEC holds a lead in terms of unit shipments and largest installed base but trails IBM in shipment revenue, largely because so many of IBM's shipments involve expensive high-end systems such as the 4381.

"Since the average system price for IBM's medium-scale offerings is substantially higher than that of its main rivals, Big Blue can make the most money without shipping the most computers," the report said.

Expanding on that report, Mikita said, "For IBM, the medium scale is right at the border in terms of success. It is in the small-scale market where IBM's market really falls apart."

Mikita noted that IBM's introduction of four new models of the 4381, including a low-end Model 11 aimed at the superminicomputer market, helped IBM's price/performance figures but not enough to have a major impact on the medium-scale market. He said that one of IBM's next steps, the introduction of a microprocessor-based 370 architecture machine, could have a greater impact by driving the entry point for that mainframe architecture still lower.

However, Mikita added, there is no consensus on whether a mainframe architecture is suitable for the lower end of that market.

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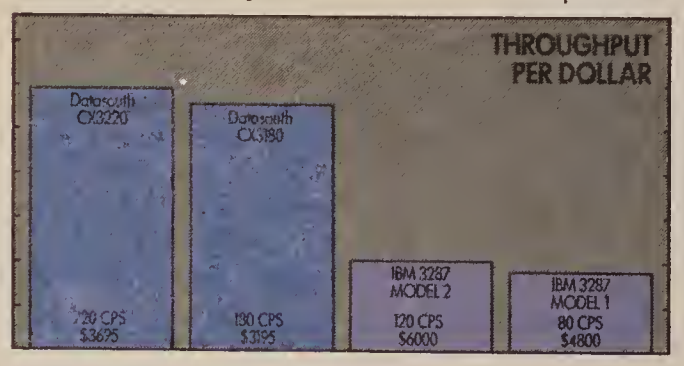

The CX 3180 is a 180 cps workhorse designed for a 100% duty cycle. The CX 3220 is a multimode printer that prints near-letter-quality text at 45 cps, as well as DP output at 220 cps. It also does high-resolution dot-addressable graphics.

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New Dimensions in Software Productivity.

Software brings CAD to workstation level

By David Bright

DAYTON, Ohio — NCR Corp.'s Microelectronics Division has introduced two sets of software tools said to allow complete integrated circuit design at the workstation level. Called Vigen and Vilay, the products are additions to NCR's VLSI Design System that runs on Mentor Graphics Corp. workstations.

According to NCR Microelectronics officials, the new products cost-effectively bring mainframe computer-aided design power down to the workstation level.

Vigen is a cell generator and compiler; Vilay is a design and layout tool with over-the-cell routing for high-density designs.

Developed jointly by NCR Microelectronics, Mentor Graphics and Silicon Design Labs, Vigen reportedly helps designers incorporate more functions on a chip than previously possible for workstations, decrease design times and increase chip performance.

When creating an application-specific integrated circuit design with Vigen, the system designer can customize a cell by specifying the desired parameters.

The designer can also specify and generate a desired logic block "on the fly" while still in a schematic capture system. The generated cells can then be used with traditional fixed standard cells in schematic capture and logic simulation. In addition to the automatic place-and-route software and layout editor software, Vilay includes interconnect and timing analysis postlayout verification tools and various utilities such as I/O preplacement.

Vilay was jointly developed by NCR Microelectronics and Mentor Graphics.

With Vilay, "the designer can make important choices and refine his design at any point in the project," said Gene Patterson, NCR Semicustom director.

Both tool sets should be available in the fourth quarter. Vigen is expected to be priced at approximately $15,000 per system, Vilay at $16,500.

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IBM 4300s next in line

From page 35

IBM's long-term plans.

If IBM bills the Micro370 as a replacement for the 4361, it will present a clear message for 4361 owners — they are doomed. But there could be other messages in a Micro370 announcement. One such problem could be an alignment of the Micro370 against the System/36.

One analyst who says that such an alignment is unlikely to happen immediately is Francis Gens of International Data Corp. "The key for the Micro370 will be how soon they can get the software for it so they can make it a turnkey system and eliminate the need for a system operator. That means that it might be a while before it is a real office machine," Gens says. So the Micro370 will probably be promoted in the 4361's market, supporting engineering, scientific and limited commercial applications.

There remain at least two more interesting developments that IBM may bring to the public within the next month or two. The first is a renewed effort to drive 4300 customers from DOS/VSE to MVS. IBM has been trying to do so for several years with limited success and is expected to use financial incentives to push harder. But, as Gens noted during a recent interview, the challenge for the IBM sales rep and the low-end systems user is justifying the cost and overhead connected with MVS.

The second development is an expected statement of direction relating to a long-term effort to implement a cross-system software consistency. IBM reportedly has formed a special team of software engineers to develop common interfaces and tools that can be used with all of its mainframe and minicomputer systems. The problem with this effort — expected to involve piece-by-piece developments over the course of years — is that it sounds so much like what IBM has tried in the past. IBM has tried to make its systems communicate in the past, and, despite all of the company's power and resources, links between the diverse product lines are far from wrinkle-free, to say the least.

Lynk intelligent systems bow

From page 35

Lynk also unveiled two printers for the System/36 and 38. The Lynkwriter/224 is a 400 char./sec., 132-column dot matrix printer that emulates the IBM 4214, but operates at twice the speed, according to Powell. The Lynkwriter/224 provides near-letter-quality printing at 100 char./sec. and text-quality printing at 200 char./sec. It will be available in September for $4,495.

The Lynkwriter/214 LC is a 250 char./sec., 132-column, high-resolution impact dot matrix printer that connects directly to System/36 and 38 channels and emulates all the functions and features of the IBM 5219 printer for $3,250.

Product Spotlight

Edited by Barbara Wierzbicki

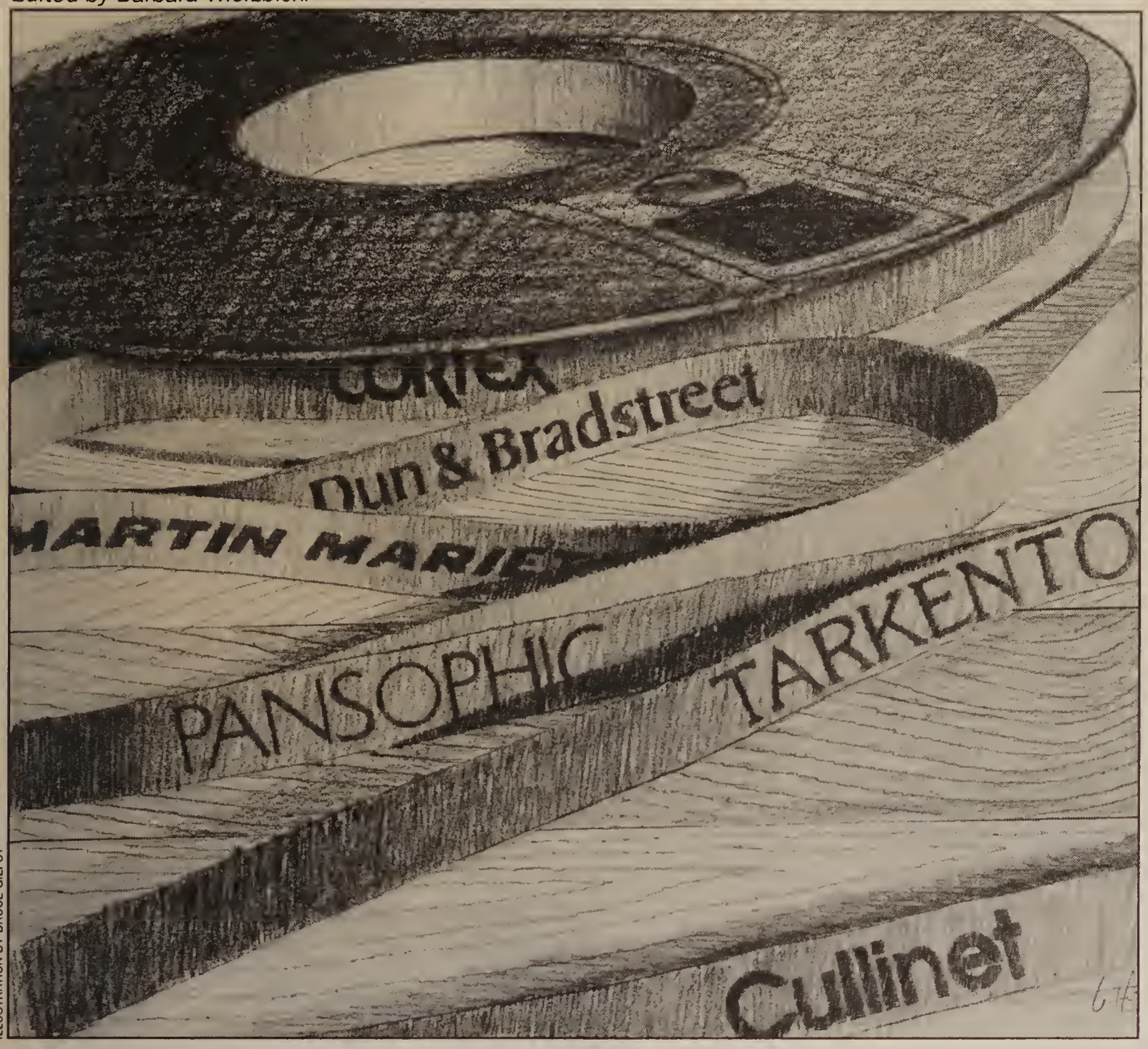

ILLUSTRATION BY BRUCE GILFOY

INSIDE

***Application generators and DBMS: A dynamic duo*/42**

***Chart of selected application generators*/49-50**

Application generators

Tools can give MIS a needed productivity boost

By GLOVER T. FERGUSON and PER O. FLAATTEN

Toward the end of 1983, the information systems department of Du Pont Co., based in Wilmington, Del., found itself faced with a massive application backlog. To position itself for the development effort that would be required, the department undertook a project to create an integrated environment to boost the entire systems life cycle productivity. A project team of five people was assembled for this purpose. At the time, there was a well-established systems life cycle and an associated methodology, but both the development and the maintenance areas suffered from a proliferation of technologies, with each project manager tending to use the technologies — productivity tools, data base management systems (DBMS), teleprocessing monitors and so on — that he knew best.

Du Pont's approach to the problem was to start by analyzing the application backlog in order to classify the types of systems that were likely to be developed over the following five years or so. Then, a technology plan was developed. This plan identified, for the various types of systems, the technical architectures that would best address the backlog.

A set of technical guidelines was prepared to support the project teams, and a compatible set of tools was acquired for each target environment. When satisfactory tools were not available on the market, they were developed from scratch. These tools were then integrated under a common interactive programming environment, combining functions ranging from source program editing to code management, and they were interfaced with an analysis/design tool and a central data dictionary.

Now, 2½ years later, the project is in its final stage of rollout. An informal study shows that productivity has increased by at least 20%. More important, Du Pont says it believes that high-quality systems are being developed.

All MIS departments are under fire to produce.

Continued on page 42

Selecting and installing an application generator requires MIS to analyze requirements, design, code, test and train. In short, you must perform the work of a systems integrator.

Ferguson is a partner in the Technical Services Organization of Arthur Andersen & Co., based in Chicago. He is in charge of designing and supporting systems development tools worldwide for the use of Arthur Andersen consultants on client engagements. Flaatten is Arthur Andersen's manager of information technology research, specializing in the systems development tools market.

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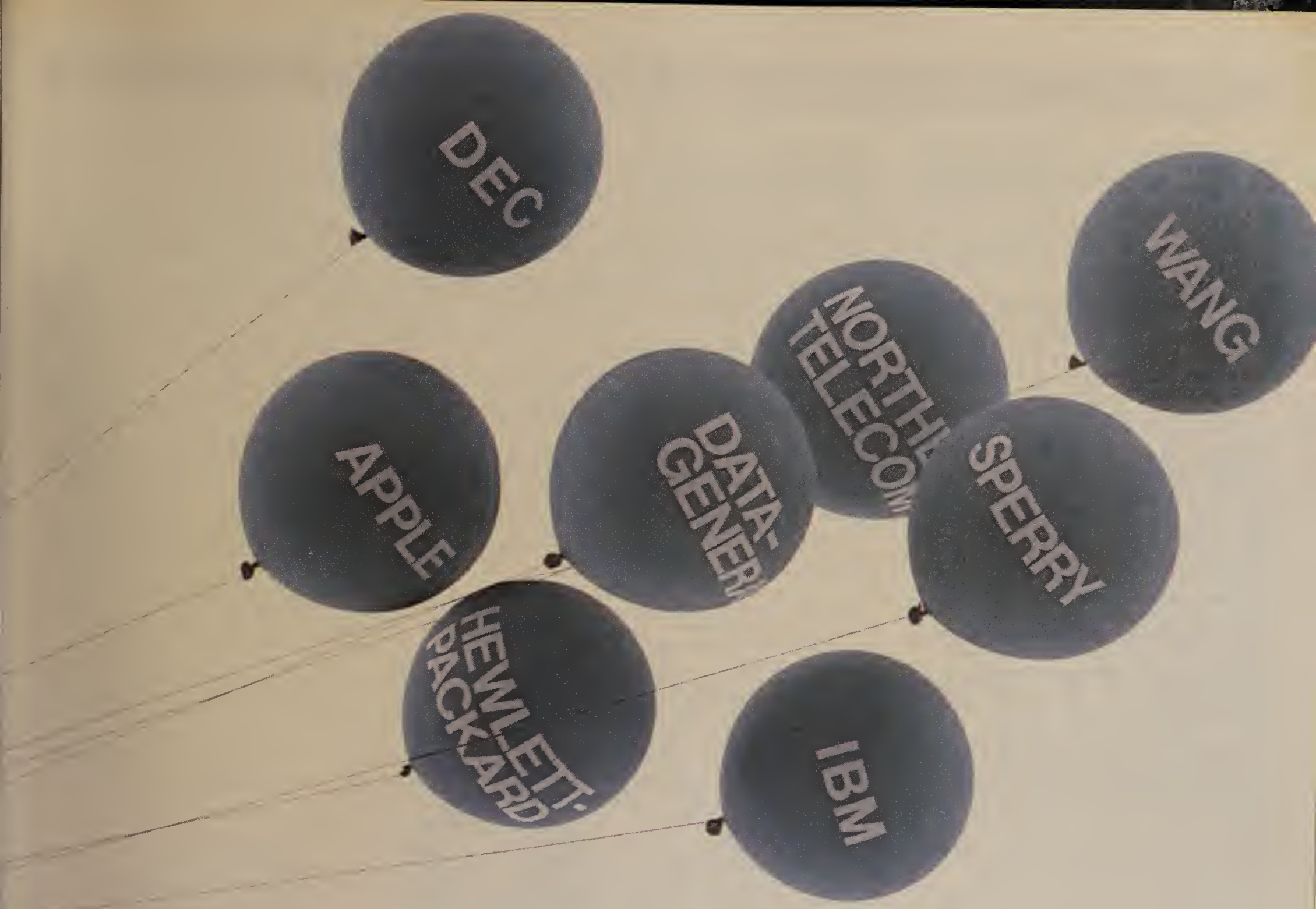

meridian SL-1

NETWORKING

Tools give productivity boost MIS needs

Continued from page 39

To respond to the pressure from the executive suite and to step up production of new applications, MIS is looking to an increased use of tools — report writers, application generators, fourth-generation languages — in order to boost productivity levels.

The Du Pont figure of 20% quoted earlier is less impressive than the five-, ten- or twenty-fold increases in productivity that some vendors claim. Such increases may be possible but only under different assumptions or different circumstances. For instance, if the starting point is low enough, it is easy to produce dramatic increases in productivity. However, this happens mostly as a result of a combination of factors, such as increased motivation, better training, new hiring and better system development standards.

These factors tend to occur whenever a new tool is implemented, regardless of the merits of the tool as such. There is a theory that any change, however minor, produces an increase in productivity simply by getting people to focus on what they do.

Another explanation for inflated figures is the tendency to measure productivity only on that part of the life cycle that the tool addresses. For instance, a report writer user quoted productivity gains five to 10 times that achieved with Cobol. However, since report writing constituted less than 10% of the entire development activity, the total impact was considerably less.

The last explanation is the vendors' natural tendency to report the most extreme success stories — the cases in which the application developed, the organization and the technical environment all were a perfect fit for the tool. This is too much to be hoped for in every case.

Nonetheless, a 20% or 25% increase in productivity is a substantial improvement. For a typical MIS department of 25 project managers, analysts and programmers, where maintenance is occupying two-thirds of the department, the payback period for a representative application generator would range from one to four years — or a savings of, say, two developers. This is not to say that you can expect to decrease your head count by two, but you can avoid hiring two new people. In other words, you get two more developers for free.

More to the point, it may enable you to implement a critical application in six months instead of nine — or it may allow you to enhance that critical application so that your organization can keep ahead in the competitive race.

Another hidden productivity improvement occurs when richer functionality can be delivered for the same effort. In all these cases, the payoff can be considerably higher than the direct payroll savings.

When such tools are purchased without having planning and organizational measures securely in place, however, the results can be disappointing. Buying tools without investing in requirements analysis, selection, preparation, training, implementation and support has been tried: It does not work. The lessons to be drawn from Du Pont's success are twofold. First, it takes planning, time and effort to undertake such a project. Second, it cannot be done without dedication and commitment from the organization.

Before addressing application generators specifically, we must first hit upon a working definition of the product. To that end, this article includes those products that mechanize some or all of the activities usually associated with the detailed design and programming of custom applications.

To qualify as an application generator — as

Continued on page 45

Expert's Opinion

Integrating tools speeds and simplifies application building process

By SHAKU ATRE

In the computer industry, when users embrace a concept, that same concept — under a plethora of different names — is introduced by a number of vendors. Such is the case with application generation. These tools come under various names, including development workbenches, fourth-generation languages, program generators and programmer productivity tools. Some 300 vendors offer such tools for mainframes and another 150 do for micro-based systems.

As if the sheer number of available products was not enough, these tools also employ different approaches to the tasks of simplification of development, modification and ongoing support.

One such tact is to make an application generator an integral part of a data base management system. When these two components work in tandem, programmers can generate software that allows application programs to be written faster and better.

What features then should be provided by a DBMS with application generation facilities?

Procedural features.

Interface to high-level procedural languages, for example, Cobol, PL/I, Fortran and APL.

Interface to low-level procedural language such as assembler.

Full set of structured constructs.

Performance monitoring, tuning and enhancement features.

Third-generation language programmer usability feature.

Nonprocedural features.

Query language.

Report generator.

Graphics generator.

Relational front-end feature.

Two-dimensional menu interface feature.

Easy-to-use editors.

Support of sequential files such as VSAM.

Integrated and active data dictionary/directory.

Data base design techniques.

Data definition, data manipulation, data control features.

Decision support system features.

Financial modeling language.

Statistical analysis.

Interface to standard statistical packages such as SAS Institute, Inc.'s SAS.

Support of electronic spreadsheets.

Mainframe-microcomputer connection feature.

Programming languages on mainframe and equivalent counterpart on microcomputer.

Separate version of tool that runs stand-alone on both microcomputer and mainframe.

Mainframe-to-microcomputer transmission feature.

Mainframe-to-microcomputer communication link.

Extraction capability on mainframe for downloading.

Multiuser environment support feature.

Support of standard teleprocessing monitors such as IBM's CICS, TSO and CMS.

IBM 3270 emulation feature.

With all these features, how effective will the programmers and the programs be, and how effectively will these programs run? Effectiveness is doing the right thing; efficiency is doing the thing right. Application generators in tandem with DBMS should provide us with programmer effectiveness but what about efficiency? We have to achieve the right balance between the use of application programmer resources and the use of the computer resources. Deriving the most benefit from available resources may be one of the biggest managerial challenges to application generation implementation.

The chief advantage of using an application generator integrated with a DBMS is that these tools speed the application-building process. Equally important, applications are easily and quickly modified, thus minimizing debugging problems and thereby reducing maintenance costs.

"Deriving the most benefit from available resources may be one of the biggest managerial challenges to any tool implementation."

— Shaku Atre

As is the case with most products, however, there are trade-offs.

Computer resource usage with these tools is high, a significant drawback. An application generator uses up to 50% more computer resources than does a third-generation language performing an equivalent function. This is because application generators make the computer do most of the drudge work that third-generation languages make people do.

The difference comes primarily in the usage of I/O operations, rather than CPU processing. Poor data base design could balloon this figure much higher. Further, since most of today's application generators are targeted to IBM 370-compatible machines, program transportability is poor.

Moreover, these tools do not handle computation-intensive work well. The application generators target the same computer spectrum as does Cobol — I/O-intensive character- or byte-crunching operations rather than CPU-intensive number-crunching operations.

For this reason, a scientific third-generation language such as Fortran should still be used for computational work. If an application requires both character crunching and number crunching, I suggest writing the program with an application generator but calling the third-generation language routines for computational work.

The point is that applications must be selected carefully. A banking deposit and withdrawal system with high-speed real-time requirements would be a poor choice for an environment in which to use an application generator.

Materials requirements planning, however, with its integration of inventory, purchasing, bill of materials, engineering planning and accounting data bases, would be ideal for application generator implementation. ■

Atre is president of Atre International Consultants, Inc. of Rye, N.Y., which specializes in information center implementation and data base/data communications consulting and training.

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A CHECKLIST FOR EVALUATING APPLICATION GENERATORS

Power of the language.
Control flow: High-level branching among applications. Screen selection by function key.
Implicit data movement between fields that have similar names. Can these movements be overridden?
Validation and editing capabilities.
Error handling.
Context data handling in conversations consisting of multiple exchanges.
High-level constructs.
Basic syntax.
Subset suitable for end-user computing (query/reporting).

Technical environment.
Product compatibility with such prerequisite software as operating system, teleprocessing monitor and data base management system.
Hardware compatibility regarding color, graphics, personal computers.
Security.
Third-generation language interfaces (Cobol, PL/I): Can subprograms be called? Can source statements be intermingled? Can generated modules be called from Cobol or PL/I programs?

Data dictionary support.
Support for data element — or field — description. If this does not exist, the data description facility cannot be qualified as a true dictionary.
Support for relationships between records, files, programs, jobs and so on; user extensibility.
Version control, for example, test vs. production.
Bridge to other dictionaries and/or batch data entry in addition to the normal on-line data entry.
Cross-reference reports and usefulness for maintenance analysis and planning. Can the user create his own cross-reference reports?

Vendor support.
Vendor stability.
Frequency of product releases and future plans.
Existence of a users group.

Data structures.
Repeating groups on screens, reports and files.
Multiple record types on the same file.
Record/field redefinition.
Variable types such as binary, packed decimal and floating point.
Array handling; number of dimensions; availability of operators handling entire arrays as opposed to programming a loop and using subscripts.
Relational operators — SELECT, JOIN, INTERSECTION; "set-at-a-time" processing, for example, FOR EACH record WHERE . . .
Default options provided for simple queries and reports.
Extraction of multiple reports on a single pass of the data base or master file.

Ease of use.
Ease of learning.
Ease of use. (This is not synonymous with ease of learning. Many easy-to-learn products are easy to learn, because they can only do simple things. They are therefore not easy to use on medium to complex problems.)
On-line Help and documentation.
Interactive/interpretive vs. source generation-oriented.
Symbolic debugging.
Support for test-production version control.
Support for on-line testing ("scripting" or terminal simulation).
Support for regression testing.
Coexistence with present shop standards such as menu structures, function key usage and languages.

Enterprise/application requirements.
Compatible with the present systems development life cycle.
Generates the type of application required, for example, transaction processing, management information and control, professional support.
Supports concurrent data update and automatic recovery restart within application performance constraints.
Special staffing requirements.
Non-English language support where required.

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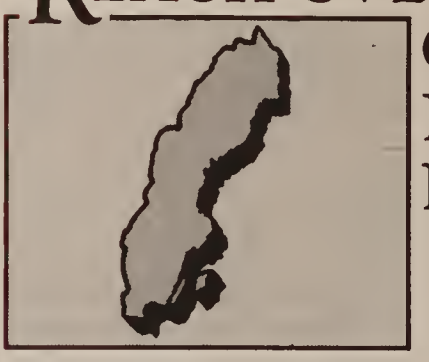

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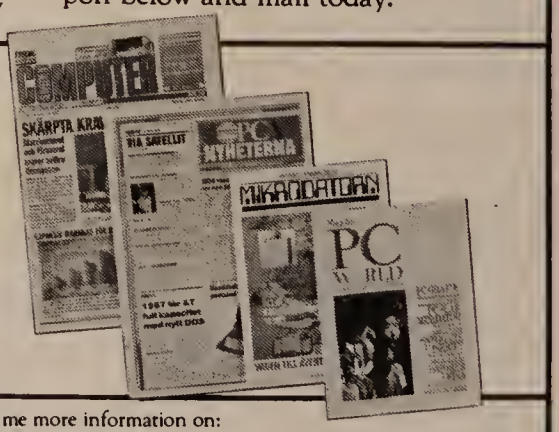

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opposed to a screen or report generator, a Cobol precompiler or a data dictionary — the product should address all four areas of application coding:

- Screen design.
- Report writing.
- Data base description and manipulation.
- Procedural code.

The hallmark of commercial data processing requires that all these areas be addressed. This explains the success of application generators in this part of the DP community and its absence from other areas such as systems programming, embedded systems, mathematical/scientific applications and so on.

This definition covers several types of application generators:

Transaction processing generators, first and foremost, are well adapted to the on-line environment. Many of these products also generate batch programs, although this is not their primary strength. The environment in which they operate is usually the target machine vendor's DBMS and teleprocessing monitor — in the IBM world, it is CICS-DL/1 and, more recently, IMS-DB/DC as well, but not yet DB2. Therefore, they are very well suited to generating production-quality applications, with concurrent data base updates and extensive recovery/restart. This type of product has been popular for about 10 years.

Fourth-generation languages may well represent the most popular type of application generator to date. Historically oriented toward report writing, these products usually add their own file structure and are also capable of generating on-line transactions to update these files. Thus, they can support the development of all aspects of an application — provided the requirements are simple enough.

The current weaknesses of fourth-generation languages lie in the areas of concurrent update and restart/recovery, which are either inadequate or costly to implement. However, several manufacturers have begun enhancing their offerings in the past year or so to include more and more production-like facilities.

These products, like the transaction processing generators, have been available for 10 years or more. Moreover, fourth-generation language popularity has been boosted by the advent of information centers and end-user computing.

Comprehensive information management systems, products that hit their stride in the early 1980s, may be found at the data base end of the spectrum. Here, the central facility is the DBMS, to which is added a high-level language and tools such as screen painters and query and report languages. Production-quality applications are the result, since it is possible to take full advantage of the underlying DBMS.

However, the implications of selecting a tool from this category are deeper than buying a transaction generator or a fourth-generation language, since the choice is primarily that of a third-party DBMS and sometimes a third-party teleprocessing monitor as well. Note that IBM has not been and is not currently a market leader in this area: None of IBM's offerings is as well integrated or as complete as the products of the four or five leading vendors.

> ***Selecting an application today requires that you hedge some of your bets. But if you get the right fit and if you safeguard the investment in the new tool with parallel investments in planning and organizational change, the payback period should be short enough to justify the acquisition.***

Source program generators work somewhat like the transaction processors but with a few important differences. Transaction processing generators very often produce tables or intermediate code invoked by a runtime facility akin to an interpreter. Source program generators, on the other hand, produce source code in a third-generation language such as Cobol or PL/I, which is then compiled and linked into an executable batch program or on-line module.

The advantages over the "interpreted" approach are added portability and better coexistence with existing applications. The main drawback is that there is a potentially time-consuming compilation and link-edit process between coding and testing. With the interpreted approach, you can make a change and test it almost in the same breath. A perceived advantage of the source code generators is that there is an apparent safeguard against performance problems or bugs in the generator. Users feel that they can always, as a last resort, fix the generated Cobol or PL/I code. Such products have existed for a long time, but their increased popularity is a recent trend prompted by the ever-decreasing cost of compilation.

Each of these categories tackles primarily one of the four facets of an application — screens, reports, data

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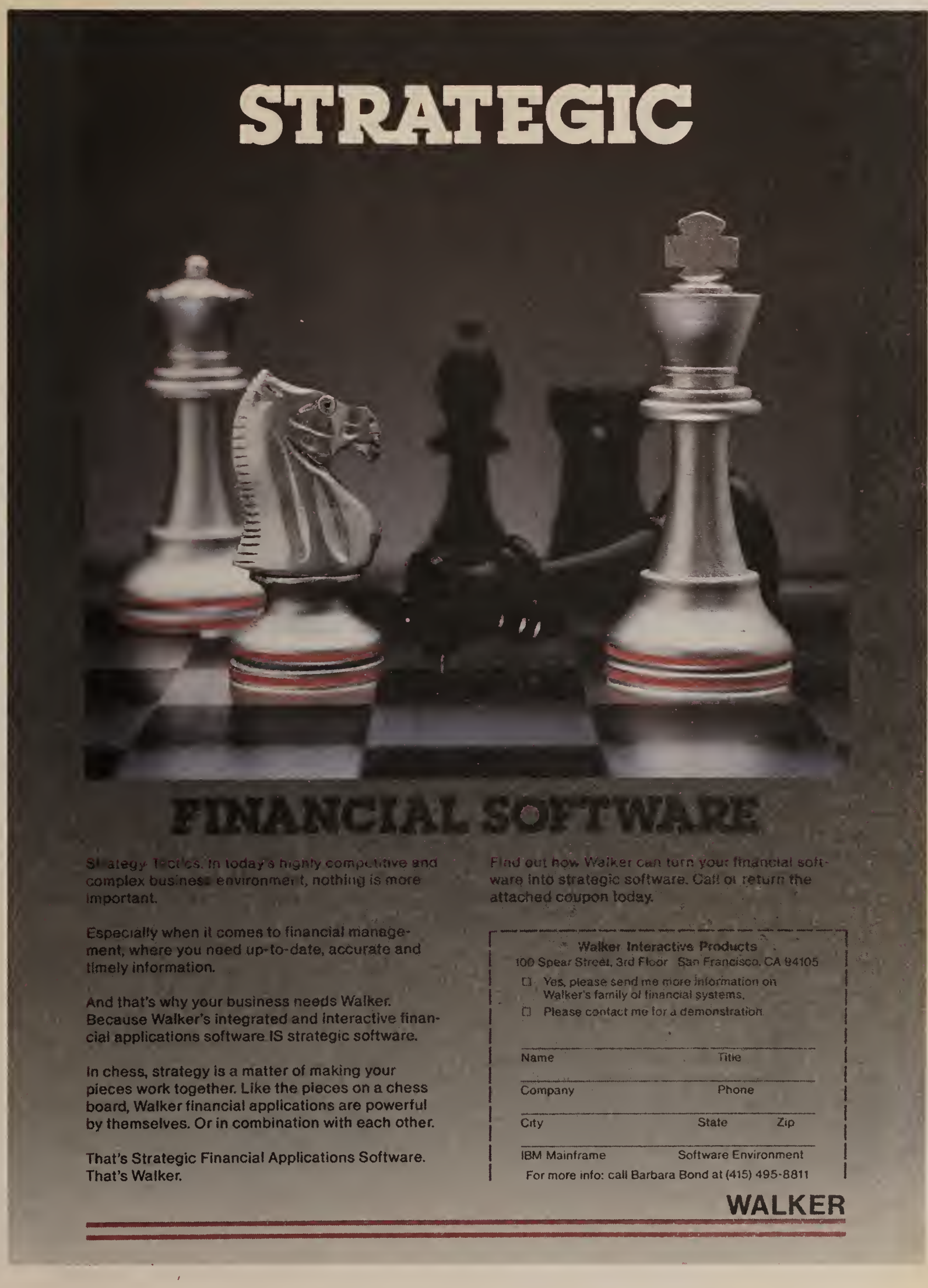

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bases and code — and adds facilities for the other three. These tools vary in style and features, but their functional capabilities are basically the same — with perhaps the exception of the fourth-generation language. As previously stated, the strength of fourth-generation languages lies in report writing, but their weakness is that they do not provide the necessary foundation for on-line transaction processing — concurrent update and automatic recovery/restart. Offsetting this is that a fourth-generation language is the only kind of tool that allows end users to develop their own applications.

There are other tools that are often forgotten when discussing application generators. Since they do offer most of the functions of application generators, it is pertinent to include them here.

First, there is the category of application generators initially provided by software vendors as a tool for customizing the application package, but which are evolving into full-fledged application generators. Millenium:SDT from McCormack & Dodge Corp. is just such a product. Second, there is a category that we may call the workbench approach, which consists of tools that make it easier for the programmer to reuse code and which may also provide hardware resources, such as an intelligent workstation. Maestro, from Four Phase Systems, a subsidiary of Motorola, Inc., for example, provides a programming environment for reusable code.

Honorable mentions also include partial application generating tools such as screen generators, query programs and report writers, data dictionaries and macro or shorthand preprocessors. There are also a number of tools that automate the first part — analysis, specification and design — of the systems development cycle.

Last, halfway between application generators and application software (perhaps closer to the latter) are facilities such as decision support systems, spreadsheets and personal computer-based tools.

This completes the characterization of today's productivity tool offerings. The market figures for the product categories outlined above totaled $500 million worldwide in 1984 and that figure is projected to grow 25% a year to reach $2 billion in 1990, according to International Data Corp., a Framingham, Mass.-based market research firm.

This expanding market offers a plethora of fast-changing products. Those that are more end-user oriented are gaining production-like facilities, while those aimed at information systems professionals are getting friendlier interfaces. The data base-oriented products are becoming relational, and there is experimentation with artificial intelligence techniques such as rule-based systems and natural languages. Intelligent workstations — PCs tied to the mainframe — are revolutionizing both the application development process and the structure of the applications themselves. The field is in a state of flux.

Despite all this activity, however, it appears that there is not much more productivity to be gained from today's technology. Arthur Andersen says that there are three reasons for this. The first limitation is that only a small part of the development life cycle is mechanized. We need to integrate requirements analysis, specification, design, coding and testing in a single tool that will also permit project management, change control, easier maintenance and performance tuning. This type of product will evolve over the next few years.

The second limiting factor is that productivity increases must be based on the reuse of standard functions. So far, only technical functions are reusable: screen painting, conversation structure, batch architecture, simple validation rules and reporting functions such as running totals and control breaks. To increase productivity greatly beyond what today's tools can accomplish in the design and coding areas, we must move on to a higher level of abstraction and reuse business functions (those expressed by the user) rather than just the technical ones. Object-oriented programming shows some promise in this area, but it must be transformed and adapted to the world of commercial data processing.

The third technological restriction is the new style of application that is emerging, based on the replacement of dumb CRT terminals by personal computers. This style, often called cooperative processing, is based on dividing the application functions between the mainframe and the workstation, so that most of the user interface is executed locally. This approach has the potential to create much friendlier systems and increase the user's productivity dramatically. But the rules of this game are not yet set, and the concept will have to mature considerably before we can hope to see the tools to generate these applications mature correspondingly. The situation is analogous for departmental computing and other forms of distributed processing.

This tumultuous state of affairs poses a dilemma to the vice-president of MIS who wishes to acquire an application generator: Will the tool that suits him best today also be best tomorrow? This quandry only gets worse when you consider that we may be on the eve of a breakthrough in new technology for the automation of systems development.

It is easy to predict that things

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will change; it is not so easy to predict how. To select an application generator today will require you to hedge some of your bets. But if you get the right fit and if you safeguard the investment in the new tool with parallel investments in planning and organizational change, the payback period should be short enough to make the acquisition economically justified.

The single most important criterion for choosing an application generator is whether or not it will generate the type of application that you require. There are three basic types of commercial data processing applications: transaction processing — simple on-line data entry and data base update with some reporting and very high performance, reliability and availability requirements; management and control — primarily accounting and accounting-related applications; and professional or executive support — also called strategic applications.

The second criterion is: Will the generated application run in my technical environment? On my mainframe? On my terminals or PCs? Under the requisite operating system? Will I have to change my choice of DBMS? My teleprocessing monitor? Many of these questions are only relevant if you have IBM or IBM-compatible equipment.

In most other cases, there is only one environmental solution and thus only one or two appropriate generators. Then the question becomes, Can I use the available tools at all? Since most shops already have some tools, or at least shop standards and a shop culture, the generator must be able to adapt to the existing environment.

A related concern is that of the coexistence of the applications generated with the programs that are already running. This is usually most critical for transaction processing. The issues to be resolved involve such matters as the conversational structure under CICS: Can I mix and match old and new transactions within a conversation? Within a partition or region? If the application must reside in another region, what operational difficulties does this cause for the operator of the system in the user department? Can I interface to existing routines — or indeed augment the generator — written in a standard programming language such as Cobol or PL/I?

The last tier of this selection criteria is how much of the life cycle is covered by the application generator and other tools that can be integrated with it. This is not an easy question to answer, since practically all products today are designed to cover a relatively small part of the systems life cycle. For example, there is a huge gap in the area of testing support, requiring you to purchase several products from different sources. It is difficult to predict whether different tools will behave with synergism — or whether they will coexist at all.

There are a number of functions and features that are emphasized by vendors of application generators. Only you can decide whether they are important to you. Pick a small number of criteria that your choice must meet, and then, if more than one candidate should remain, use a list of secondary criteria. This will avoid the situation that is frequently seen, where the product is picked on the basis of "gut feel" and justified by a creative checklist that stresses the preselected product's areas of strength and glosses over its weaknesses.

> ***Pick a small number of criteria that your choice must meet. This will avoid the situation where the product is picked on the basis of 'gut feel' and justified by a creative checklist that stresses the preselected product's areas of strength and glosses over its weaknesses.***

The secondary characteristics that you select will obviously depend on your own situation. If productivity improvement is your main criterion for picking an application generator, the following factors are the most important:

- Data dictionary support.
- Power of the language.
- Development environment.
- Maintainability.

Weighed against the productivity benefits are the visible and hidden costs. The purchase or lease price of the software is the main visible cost. To this you must add the cost of vendor support, upgrading to future releases, training and implementation, personnel requirements and the hardware environment. In particular, if you have a hardware-constrained situation, you should evaluate the resource utilization of the generator, both when generating and — probably more importantly — when running the generated application in production.

The real performance pitfall comes when the application generator makes assumptions about the

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application logic and/or the data base structure that do not hold true. For instance, an application generator might generate a data base description for an inverted-list type of DBMS with an index for every field in the data base — just in case — most likely causing very high response times for update transactions. The balanced view on performance is that since hardware resources are becoming more and more affordable, the overhead of an application generator is less and less important — but there are always applications that are so demanding that they need to be coded with special care.

An application generator may not be a suitable solution for those applications at a given time. If you are in doubt whether an application generator will handle your performance requirements, the best approach is to try to find, with the vendor's help, a similar application with higher volumes successfully operating on the same hardware that you have.

Another user realized that he could save substantial resources by creating a data base extract program to create a report file, against which he ran his report writer to produce the daily reports. Had he not realized that the report writer he was using required a sequential pass of the entire data base for each report to be printed, he would have been using much more resource than necessary.

It is important to analyze the technical architecture of the generated code before finalizing the design of your system. In fact, this should be done before you even decide which parts of your system will be written using the generator. This is especially dangerous when using the generator for problems that it was not intended to solve. In particular, we cannot overstress the danger of using an end-user-oriented product for high-volume transaction processing.

Yet another pitfall lies in not recognizing the problems of maintenance. In fact, since you can now produce applications faster than before, there will be more code to maintain. One generator vendor quotes an example of a customer on the West Coast that has literally tens of thousands of progams written in a fourth-generation language. It would not be surprising to find that this may negate some of the initial development benefits. An immediate consequence of such proliferation is that reuse and/or modification of a given program is endangered when you cannot locate it.

The most serious dangers come from inadequate management attention. There are two diametrically opposed dangers — raising expectations too high and therefore becoming disillusioned with the product before it can prove itself and insufficient prior and continued commitment. The latter problem appears to be much more frequent when installing a source code generator than when picking a DBMS with its associated generators.

As one DP development manager confided: "We gravely underestimated the impact that a Cobol generator would have on our shop. Maybe it's because, after all, it was only there to produce Cobol, which we were already doing by hand. Had we chosen to install a comprehensive information management system, such as those from Cullinet Software, Inc., Applied Data Research, Inc. or Software AG of North America, Inc., we would probably have prepared ourselves much better. As it is, it was a miracle that we were given time to correct our mistakes and that the product we chose got off the ground."

Another frequent problem happens when the rollout process is not adequately planned and supported. We have seen many shops where only the team that picked the tool and the one that used it initially, perhaps on a pilot project, reap the benefits. The tool may be unused by the rest of the teams, or it may be used halfheartedly.

In fact, if there is one lesson to be learned from the successes and failures we have seen, it is that the process of selecting and installing an application generator and associated tools deserves to be treated as any other development project. It has all the same characteristics. It is nothing more than the automation of certain repetitive tasks normally performed by analysts and programmers.

To automate successfully, you must understand all the functions performed in your department as well as their interactions. The same life cycle applies as in any other project. You must analyze requirements, design, code, test and train; you must procure and install hardware resources. In a word, you must perform the work of a systems integrator.

What this means is that the acquisition of a tool should be preceded by planning, planning and planning. This is what happened in the information systems department of Du Pont. They put together the best project team they could muster — not the best project team they thought they could spare. They planned and conducted the project as though they were doing it for their most important user. On the whole, they managed to give the project team the support it required to choose and implement the best solution.

Finally, note that Du Pont was working from a solid foundation of methodology, standards and well-trained people. Remember that if you try to mechanize chaos, all you are going to achieve is the ability to produce more chaos faster. ■

SELECTED PRODUCTIVITY TOOLS

APPLICATION GENERATORS FOR TRANSACTION PROCESSING

Cortex Corp.
128 Roberts Road
Waltham, Mass. 02154
Cortex Application Factory
Number installed ..... Not available
Target environment..... DEC VAX
Price ..... $4,200-$100,000
Cortex Application Factory is a complete, integrated application development system that automates development and maintenance of medium-size to large production business applications directly from specifications entered on-line.

Cincom Systems, Inc.
2300 Montana Ave.
Cincinnati, Ohio 45211
Mantis
Number installed 2,000
Target environment..... IBM MVS IMS, VM CMS, VAX VMS, Wang VS, Honeywell USAS
Price ..... $20,000-$80,000
Mantis is a fourth-generation development system that addresses the life cycle of an application from prototyping through production. It is a fully interpretive procedural language that allows applications to be developed, tested and debugged on-line.

IBM
Contact local marketing representative
Cross System Product (CSP)
Number installed ..... Not available
Target environment..... IBM CICS/OS/VS, CICS/DOS/VS, IBM SSX/VSE, VM/SP CMS
Price ..... $10,970 plus monthly license charge of $550
CSP is an application development and execution system that integrates the following functions into one set of tools: structured program design, program editing, definition librarian, screen definition, high-level language processing, prototyping, on-line testing and debugging, query and report generation for files and cross-system program portability.

IMSADF II
Number installed ..... Not available
Target environment..... IMS
Price ..... $54,890 plus a monthly license charge of $2,500
IMSADF II is a general-purpose programming system for generating and executing IBM DB/DC applications. It provides facilities for developing, maintaining and extending IBM on-line or batch data base/data communications applications.

Martin Marietta Data Systems
P.O. Box 2392
Princeton, N.J. 08540
UFO
Number installed 1,900
Target environment..... CICS, OS, DOS, VS, CICS/VS, CMS, VM
Price ..... $40,000-$55,000
UFO is part of Consensus, an integrated on-line application development system. Users develop on-line applications or access data by using any combination of Consensus's three interrelated on-line components: UFO, OPL4 and Cobol XE. UFO is a nonprocedural approach to on-line program development.

Pansophic Systems, Inc.
709 Enterprise Drive
Oak Brook, Ill. 60521
Gener/ol
Number installed 800
Target environment..... MVS, VSE, CICS, DOS
Price ..... $35,000-$49,000
Gener/ol is an interactive applications development system for CICS. Company support interfaces for major data base vendors is provided. Gener/ol also features a command builder that allows you to write your own interfaces and languages not usually supported, such as Fortran.

Sperry Corp.
Information Systems Group
P.O. Box 500, Mail Station B-200
Blue Bell, Pa. 19424
Mapper
Number installed 2,000
Target environment..... Sperry 1100
Price ..... $62,100-$68,310
The Mapper system is a fourth-generation language productivity environment that provides end users with programmerless facilities. It also offers the DP department computer-aided application development tools that cover the entire life cycle from business analysis to ongoing maintenance.

Sterling Software
Answer Systems Division
21050 Vanowen St.
Canoga Park, Calif. 91304
Mark V
Number installed 150
Target environment..... MVS (IMS DB/DC, CICS); VSE (CICS)
Price ..... Available upon request
Mark V is an application development system for the design, prototyping, implementation and maintenance of complete on-line systems with performance-critical requirements. Mark V provides application portability by generating applications for IMS or CICS and is upwardly compatible with the new IBM release.

DBMS WITH APPLICATION GENERATION FACILITIES

Applied Data Research, Inc.
Suite CN-8, Rt. 206 and Orchard Road
Princeton, N.J. 08540
Datacom/DB with Ideal
Number installed ..... 12,000 DB, 750 Ideal
Target environment..... MVS, VSE
Price ..... Datacom/DB — $68,050-$116,000, ADR/Ideal — $54,900-$97,900
ADR/Ideal is a fourth-generation application development system. It is a fully relational DBMS containing an integrated data dictionary. ADR/Ideal is used primarily by data processing professionals to build medium- to large-scale data processing applications.

Computer Associates International, Inc.
711 Stewart Ave.
Garden City, N.Y. 11530
CA-Universe
Number installed 175
Target environment..... MVS, VSE, VM
Price ..... $140,000-$170,000
CA-Universe is a fully relational DBMS with an on-line, active data dictionary. Development facilities include screen painting, auto screen generation and screen chaining. CA-Universe also includes a procedural development language called ADL and provides a host language interface facility.

Computer Corporation of America
4 Cambridge Center
Cambridge, Mass. 02142
Accolade
Number installed 75
Target environment..... MVS, VSE, DOS, PC/DOS
Price ..... $40,000-$150,000
Accolade is CCA's tool for life cycle development of on-line Cobol applications. The newest release of Accolade is a fully functioned personal computer version.

Cullinet Software, Inc.
400 Blue Hill Drive
Westwood, Mass. 02090
IDMS with ADS/O
Number installed 1,843
Target environment..... MVS, VSE, all IBM mainframes
Price $45,000
ADS/O allows programmers to build applications with IDMS/R and native VSAM applications. System increases programmer productivity of development by automating many of the repetitive data description and housekeeping tasks required of third-generation languages.

Oracle Corp.
20 Davis Drive
Belmont, Calif. 94002
*SQL*Forms*
Number installed 20,000
Target environment..... DEC Ultrix, CMS, IBM Personal Computer XT, Personal Computer AT, MVS, VSE, VAX, Unix
Price ..... $150-$15,000
SQL*Forms is a high-level fourth-generation language application generator completely integrated with the Oracle relational DBMS. Key areas of use include on-line transactions, applications processing, ad hoc query and update.

Relational Technology, Inc.
1080 Marina Village Pkwy.
Alameda, Calif. 94501
Ingres
Number installed 4,000
Target environment..... VAX/VMS, Unix, IBM VM/CMS, MVS
Price ..... $750-$35,000
Ingres is a distributed SQL-based relational data base system that is portable across systems ranging from mainframes to microcomputers. Product features include a full distributed data base and networking support. Integrated tools include a fourth-generation application development environment and end-user decision support tools.

Software AG of North America, Inc.
11800 Sunrise Valley Drive
Reston, Va. 22091
Adabas with Natural
Number installed 2,100
Target environment..... MVS, VSE, VAX, VM/CMS, DOS
Price ..... $40,000-$60,000
Software AG's Natural includes full facilities for support of the entire applications life cycle, including prototypes, coding, testing and execution of a fourth-generation language application. Components include programming, coding, screen development and query management. Natural includes full security and is fully integrated to the company's Predict data dictionary.

COBOL PROGRAM GENERATORS

Burroughs Corp.
Burroughs Place
Detroit, Mich. 48232
Linc II
Number installed 1,400
Target environment..... Burroughs A series, V series
Price ..... $20,000-$185,000
Linc II is an advanced fourth-generation information system generator. Using Linc II, analysts can define an organization in business-oriented terms by viewing its functions and operations from three basic perspectives: the fundamental components of the organization, the daily business events that occur and the different ways in which these are viewed by management in user departments. From input specifications entered through an interactive development system, complete information systems are generated including the data base, transaction management, network management and application programs.

CGI Systems, Inc.
P.O. Box 1645, One Blue Hill Plaza
Pearl River, N.Y. 10965
Pacbase
Number installed 450
Target environment... MVS, VS1, DOS/VSE, IBM DOS
Price ..... $140,000-$260,000
Pacbase is a full-application life cycle system that integrates and automates all phases of the application development and maintenance processes. It automatically creates Cobol programs, screen maps, data base descriptions, error messages, on-line application Help, user and technical documentation and management reports, all from the specifications entered in its data dictionary.

Products included in this chart are a representative sampling of the types of application generators available on the market. The companies listed responded to a recent telephone survey conducted by *Computerworld*. Vendor list supplied by Arthur Andersen & Co.
Chart compiled by Catherine Schlichte and Christie Sears.

Why does the Bank of Tokyo, Ltd. have a yen for Zeke:

Zeke automated scheduling is worth a fortune to The Bank of Tokyo, Ltd. "We've found that Zeke eliminates the possibility of out-of-order submissions and other errors," says VP/Electronic Data Processing Systems Department Manager Kazuahiro Kobayashi. "It takes the burden of individual submission off our operators.

"Zeke allows us to utilize our CPUs to the fullest."

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Zeke works for The Bank of Tokyo, Ltd.

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813 Great Southwest Parkway Arlington, Texas 76011-5428
(817) 640-8911 (answered 24 hours a day) 1-800-227-7774 (outside Texas)

Product Spotlight/Application Generators

Pansophic Systems, Inc.
709 Enterprise Drive
Oak Brook, Ill. 60521
Telon
Number Installed 180
Target environment.... CICS, IMS/DC, batch
Price ..... $130,000-$285,000
Telon is an application generation system with full prototyping capabilities. Product features include edits with error messages and integrated test facilities, allowing analysts to design and review applications — together with end users — without requiring compilation. Applications can be generated in Cobol or PL/I.

Sage Software, Inc.
3200 Monroe St.
Rockville, Md. 20852
Application Productivity Systems (APS)
Number Installed 70
Target environment..... MVS, MVS/XA, VM/CMS running IMS, DB2 or CICS, PC-DOS
Price ..... Available upon request
APS is a family of integrated ISPF-based productivity products for the IBM development center. Product is used for prototyping and development of on-line and batch DB2, CICS and IMS applications. Layered language structure provides user interfaces for multiple skills. Open architecture and rule-based systems support development environment extensibility and control.

Tarkenton Software, Inc.
Suite 444, 3340 Peachtree Road, N.E.
Atlanta, Ga. 30326
Gamma
Number Installed 50
Target environment..... MVS, VSE
Price ..... $120,000-$200,000
Gamma is an application generator that automates the physical design, documentation and programming phases of system development. Features include interactive design and specification facilities with screen and report painting capability. Its open architecture application data base design makes customized output possible.

Transform Logic Corp.
8502 E. Via de Ventura
Scottsdale, Ariz. 85258
Transform
Number Installed 60
Target environment.. MVS, IMS, CICS, batch
Price ..... $200,000-$500,000
Transform produces installable applications from design specification input. Transform Logic products automate the application development process, including program design and testing. Applications maintenance is achieved through a nonprocedural input of user specifications. Transform performs data management, automates reusability of data elements and manages data for multiple system users.

FOURTH-GENERATION LANGUAGES

D&B Computing Services, Inc.
187 Danbury Road
Wilton, Conn. 06897
Nomad 2
Number Installed 400
Target environment.....VM/CMS, MVS/TSO, IBM PC (fourth quarter)
Price $135,000
Nomad 2, a fourth-generation language/DBMS incorporating procedural and nonprocedural languages, features more than 140 functions for data manipulation and integrated decision support. Product includes a range of tools for designing customized, screen-driven systems and maintenance routines. Newly announced is the Nomad Assistant report writing facility. In addition to IMS and IDMS interfaces, Nomad 2 provides read/write interfaces to SQL/DS, DB2 and the Teradata DBC/1012 data base machine.

Henco Software, Inc.
100 5th Ave.
Waltham, Mass. 02154
Info
Number Installed 3,500
Target environment..... Data General AOS/VS, VAX/VMS, Prime Primos, Honeywell DPS 6, GCOS
Price ..... $8,600-$40,000
Info is a relational data management system and fourth-generation language designed for use on minicomputers. It provides easy access to information as well as programming capabilities to both end users and professional data processing personnel.

IBM
Contact local marketing representative
Application System
Number Installed .....Not available
Target environment.....IBM mainframes
Price .....Available upon request
Application system integrates the following into one product: data management, information retrieval, report writing, graphics, statistics, project management, business modeling and application creation. It also can be used by DP professionals to develop applications quickly to meet the specialized needs of individuals and departments.

Information Center/1
Number Installed .....Not available
Target environment..... IBM GDDM, VS APL or APL2 required; MVS or VM optional
Price ..... $22,000 plus a monthly license charge of $1,390
Information Center/1 is a set of decision support tools and aids that encourages professionals to select and organize data into a tailored, useful form. Designed for nontechnical users, it provides simple and logical menus and prompts. The major components of the Info Center/1 are data entry and validation, query, retrieval and analysis, reporting, planning and graphics.

Information Builders, Inc.
1250 Broadway
New York, N.Y. 10001
Focus
Number Installed .....Not available
Target environment..... MVS, VM, VSE, Microsoft MS-DOS, VAX, CMS, Unix, VS
Price ..... $1,295-$100,000
Focus is a DBMS with an integrated fourth-generation language. Key areas of use include tracking systems and financial and management applications. Functionally equivalent versions are available with data and application portability between IBM mainframes, VAX-, VS- and Unix- and MS-DOS-based systems.

Martin Marietta Data Systems
P.O. Box 2392
Princeton, N.J. 08540
Ramis II
Number Installed 1,700
Target environment..... DOS VSE, OS/VS1, VS MVS, VM/CMS, AT&T Unix System V, PC-DOS, VM PC
Price ..... $30,000-$90,000
Ramis II is a fourth-generation language DBMS. It is a modular information processing system designed to meet business needs using ad hoc queries, decision support and application development. It features a natural language and an intelligent menu-based architecture designed for both the novice and the expert. It has data access to all major data bases. Ramis II supports relational combinations of data from multiple files.

SAS Institute, Inc.
Box 8000, SAS Circle
Cary, N.C. 27511
SAS System
Number Installed .....Not available
Target environment.....DOS/VSE, SSX, DG Eclipse MV series, MVS, VM, VAX, various minis, IBM PC, PC-DOS, compatibles
Price ..... $1,500-$12,000
The SAS system performs data analysis with integrated procedures for data management, statistical analysis, report writing, applications development, spreadsheets, graphics and operational research. ■

On September 24 we're covering DEC and you can be part of it.

Announcing the Computerworld Extra on Digital Equipment Corporation.

For several decades, no one has posed a serious threat to IBM's stronghold as the number-one computer manufacturer. But, in the last few years, the company from Maynard, MA, has been quietly consolidating and revamping its product lines, its strategies, its entire organization. And they've set their sights on some very big targets.

In the September 24 Computerworld Extra, we'll take a thorough look at what Digital's got to offer. And why many of the world's large and mid-sized companies are now seriously evaluating DEC.

We'll discuss Digital's strengths. Its top-to-bottom architecture. Its networking and distributed processing philosophies. And the products that connect to IBM — including products that may work better in the IBM environment than IBM's own solutions.

And we'll round out the issue by interviewing Ken Olsen, the man behind the $7 billion corporation.

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The new ADDS 2020 will raise your expectations about all display terminals. You've always expected readable data. Now you can have high resolution, larger characters, 80/132 columns, 14" green, amber or white display, line graphics for highlighting, and variable-speed smooth scroll. There is, however, one thing you should not expect from the 2020—screen flicker. A unique 70Hz refresh produces a flicker-free display that you can read all day.

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Applied Digital Data Systems Inc.
A Subsidiary of NCR Corporation
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Hauppauge, NY 11788 USA
Tel. 1-800-231-5445
In New York, (516) 231-5400

I'm surprised. I didn't expect so much from a terminal. I'd like to see more information on the ADDS 2020.

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In Depth

Lobbying for protection

Corporate users can defend their own rights

Precious little is done to protect the rights of computer users. • A few individuals used their PCs to lobby against one-sided "privacy" laws — and won. • Just think how effective corporate users groups might be.

By JAY BLOOMBECKER

Warning: This is an article about how democracy is coming to computing. It is a challenge to those who would like to see it spread. I make no pretense of objectivity or dispassion — only accuracy. I want to make your blood boil and your face flush, impelling you out of lassitude into revolutionary commitment. I want to turn the "appliance operators" into "cybernetworkers" — citizens of the information age.

It is invigorating, in this age of anomie, yuppies and nuclear despair, to learn that there are people who not only care about computing but who also have been able to turn their concerns into effective action.

In the last year, four individuals — consultant Grey Staples, lawyers L. J. Kutten and Barry Bayer and myself — have mobilized the computer community in three different states (see story page 58). Small-time operators using our own petty cash for expenses, we went up against a $50,000 corporate lobbying effort and won every time.

What began as an individual effort has expanded. Corporate users are raising their voices — and they are being heard. In a fascinating dialectic, the introduction of developer-sponsored software license legislation has been followed by the introduction of consumer-oriented software warranty legislation. For the present at least, both types of legislation have been put on hold in favor of nonlegislative and economic solutions attempting to address the expressed needs of both the developers of software and its individual and business consumers. The future belongs to those who join together to have their voices heard.

Act I: Thesis

It all started with the Software License Enforcement Act. Touted as an antipiracy bill, the act was passed in Louisiana in September 1984 with great fanfare. W. Krag Brotby, president of Vault Corp., a company that specializes in copy-protection software, predicted that the law would provide a model for the other 49 states.

Vault had invested $50,000, by Brotby's estimate, in an effort to push the bill through. Alan Grogan, a respected computer lawyer whose firm represents Vault, had drafted the bill. Donald Radoff, a publicist, had set up a clearinghouse for information about software protection legislation, particularly the bill that Vault was pushing.

Press releases and interviews originating with Vault led the media to report that the bill had been introduced in California, Georgia, Texas, Maryland, Hawaii and Arizona. Actually, in three of these states the bill was never introduced. In the other three, it has gone down to defeat, at least for the moment.

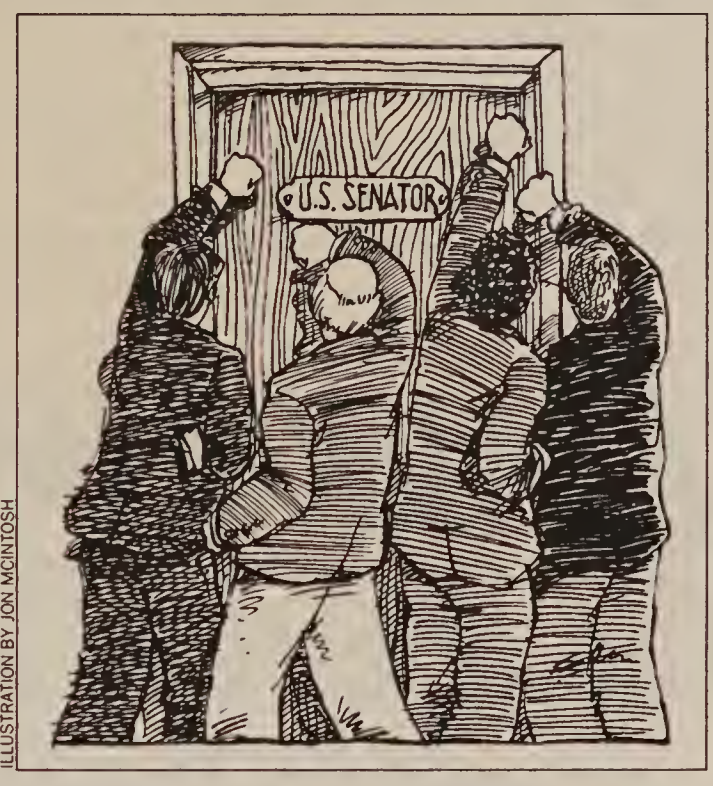

ILLUSTRATION BY JON MCINTOSH

Before declaring this result as a victory for consumer protection, a bit of background is necessary.

Making invalid contracts valid

In its simplest terms, the Software License Enforcement Act attempts to validate "shrink-wrap contracts." A look at the law and the equities of these so-called contracts demonstrates why this unusual effort to create new contract law is seen as necessary by the backers of the bill and why those consumers of computer goods and services who have looked at the bill have been almost unanimous in their opposition.

Virtually all software sold for personal computers at the retail level is accompanied by these shrink-wrap licenses. Usually a document beneath the shrink wrap on the software package warns the buyer that opening the package or using the software is deemed consent to the terms of a "software license." These terms are a set of provisions written by a lawyer for the manufacturer.

One thing that the Software License Enforcement Act attempts to do is ensure that these documents are seen by state contract law as valid contracts. Often contract law requires an active meeting of the minds. In other words, unless you and I agree to the terms of an agreement, there is no agreement. I cannot, for instance, put a label on a book and say that opening the book is deemed agreement to a license that

About the author
BloomBecker is an attorney and the director of the National Center for Computer Crime Data in Los Angeles.

prohibits you from reselling the book or from giving it away.

Yet that is the sort of agreement that the so-called software licenses seek to enforce. Whether the software licenses themselves are binding is an open question, since none has been the subject of any judicial interpretation.

The purpose of the Software License Enforcement Act is to get state legislatures to make the shrink-wrap licenses binding. It wants to change the states' laws to declare that these licenses are valid agreements and that buying or using software to which these licenses are attached does constitute adequate meeting of the minds for the buyer to be held responsible for the terms that they contain.

It is my legal opinion that contracts require — and should require — more knowing assent to their terms than just using a product that has a bunch of one-sided legalese on a document attached to it. These one-sided licenses almost invariably take as much as possible for the manufacturer and give as little as possible to the buyer. Most significantly, many of the contracts limit the warranty that accompanies the software.

> ***Limiting the warranty is a way for the manufacturer to avoid the responsibility of standing behind its product. It is a way of saying that if the software does not do what you reasonably expect it to do, that is too bad — buy another product, but leave the manufacturer alone.***

Generally, the law implies that a product will work for the tasks for which it is intended to be used. A word processing program is expected to do word processing; a spreadsheet program is expected to do spreadsheets. The effect of warranty law is to say that the consumer is protected if the product purchased does not work.

Limiting the warranty is a way for the manufacturer to avoid the responsibility of standing behind its product. It is a way of saying that if the software does not do what you reasonably expect it to do, that is too bad — buy another product, but leave the manufacturer alone.

The point I am making is that reasonable folks have found this bill to be "appalling," as Ron Beach of the North Orange County Computer Club (NOCC) put it, or that it "tramples on the rights of consumers," as computer lawyer Kutten notes.

Under these circumstances, it seems fair to assume that at the very least, users group members who buy software would be interested in knowing the provisions of the legislation and having the opportunity to present their opinions to those considering the bill.

Piracy and contract law

It is truly astonishing to see the intimidating effect of words in our supposedly sophisticated society. Call a bill a piece of antipiracy legislation, and normally sane people will choose not to challenge it lest they appear soft on what has now clearly been communicated as wrong.

Some people seem to think that to be soft on piracy is tantamount to loosing all credibility in computing circles. In many critics' eyes, users groups have been for piracy what brothels have been for prostitution.

Piracy is wrong, if by piracy you mean violations of the copyright law. How wrong it is, the most effective way to combat it, how to protect the correlative rights of the software consumers and hosts of other equally vexing and complex questions remain open and widely discussed.

Despite misleading lobbying to the contrary, the Software License Enforcement Act is not primarily a piece of antipiracy legislation. It is special-interest legislation designed to improve the economic position of software manufacturers without doing anything of substance to challenge software piracy.

In Hawaii, the state's acting director of consumer protection dispatched the connection between piracy and the software license enforcement act pending in his state neatly. "The bill appears to be an antipiracy measure intended to protect the proprietary interests of software manufacturers," Mark Nomura of Hawaii's Office of Consumer Protection testified to the state's Senate Committee on Consumer Protection and Commerce in 1985. "The bill does not appear to further deter piracy or address the primary problem — detecting the violator."

Act II: Antithesis

As the dust cleared over the shrink-wrap license battle (see story page 58), California Assemblywoman Gloria Molina was addressing the consumers' interest in microcomputer software that worked. Molina, herself the unhappy buyer of a piece of software, introduced a bill into the California legislature that would require hardware manufacturers and software developers to guarantee product performance and reliability for six months following a sale.

Although they were able to lobby successfully against the Molina bill, some vendors and ADAPSO are concerned about the possibility of widespread adoption of state legislation on warranties. David Sturtevant,

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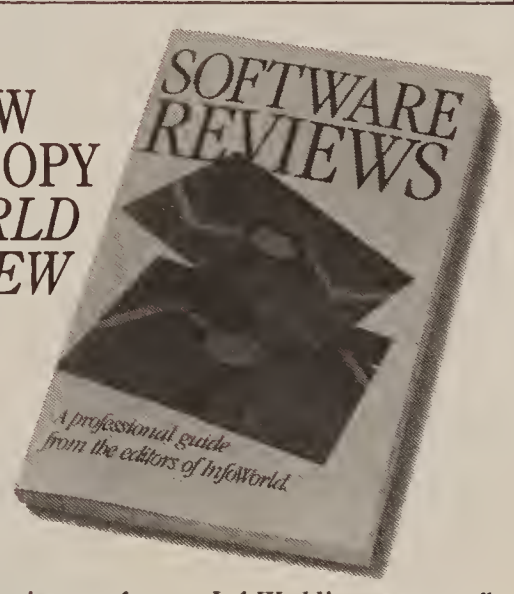

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ADAPSO's vice-president of public communications, explains that his association found the prospect of warranty laws most disagreeable.

"We favor industrywide competition in the area of warranties rather than requiring that developers all meet stringent requirements of a bill like Assemblywoman Molina's," he says. Sturtevant adds that uniformity of legislation is important to the software developer. "The cost of entry rises," he notes, "if a developer has to meet different requirements in each of 50 states."

Act III: Synthesis

The group Technical Evaluation through Strategic Cooperation (TESC) has been a prime mover in getting ADAPSO to attempt to deal with the warranty problem in a nonlegislative way, according to TESC President Robert Corr. TESC, made up of 31 primarily Fortune 100-level companies, meets from time to time with vendors from the microcomputer community to discuss issues of common concern.

Joe Cane of General Dynamics Corp., a TESC member, explains, "We thought that warranties contained in the shrink-wrap licenses were not necessarily adequate for the corporate user. We tried to approach the vendors through TESC, but that didn't have enough punch, so we went to ADAPSO."

ADAPSO's Sturtevant explains that in addition to the Molina bill and industry requests for action, tension was growing between the distribution channel, the user community and the development community. "We've gotten a lot of letters saying, 'Software vendors can't have it both ways,' " he says. "The vendors can't say, 'Don't pirate software,' and at the same time tell the consumer, 'All we guarantee you is that there's a diskette in the box.' "

The union of the two groups resulted in the formation of the ADAPSO Microsoftware Customer/Vendor Advisory Board. The board was made up of more than 30

Continued on page 60

Software laws: A brief history

Louisiana. Louisiana was the first — and only — state to embrace the Software License Enforcement Act. The bill was announced in New Orleans at a Comdex/Spring '84 press conference featuring Vault Corp. President W. Krag Brotby and Louisiana Assistant Secretary of State J. Robert Wooley. Wooley left little doubt as to his motivation, declaring his intention to make Louisiana "Silicon Bayou."

Seven months later, the bill passed. Brotby noted that it did not meet with any serious objections, concluding, "I think that indicates it is a good, flexible law."

His words should be a warning to all those readers who think that a legislature can be adequately informed without their input. In fact, the only thing that the absence of objections to the Louisiana bill shows is the fact that little exists in the way of consumer protection for computer users in that state. Anyone doubting that conclusion should try to find a functioning users group there.

Arizona. Consultant Grey Staples of Scottsdale, Ariz., did not find the Software License Enforcement Act introduced in Arizona a good, flexible law. He learned about the bill after reading a notice about it on a users group bulletin board and immediately took steps to defeat it. He obtained a copy of the bill and published its text on 60 bulletin boards in the Phoenix area.

He encouraged all computer users to download the bill, read it and communicate with their legislators if the bill was not to their liking. Several other interested parties in Arizona testified before the legislature or wrote in opposition to the bill. Despite the appearance of Brotby and Vault attorney Alan Grogan, the bill was tabled until the 1986 legislative session.

Hawaii. In the course of researching an article on the Software License Enforcement Act, I learned that Hawaii's House of Representatives passed a version of the software enforcement bill in 1985. It was to be heard about two weeks later by the Hawaii Senate Committee on Consumer Protection and Commerce.

I called Mark Nomura of the state's Office of Consumer Protection and asked him to consider testifying against the bill. He invited me to send him a memorandum expressing my position. I sent copies of the memorandum to him as well as to the committee itself. Nomura was one of the few people to testify. He opposed the bill and contributed significantly to its defeat.

> ***"I don't believe a small cadre of hired guns should be able to ride roughshod over people's rights."***
>
> — L. J. Kutten
> computer lawyer

Simultaneously, computer lawyer L. J. Kutten was engaged in a much more ambitious lobbying effort. Taking advantage of the communications capabilities of Readers Digest Association, Inc.'s The Source, Kutten sent Sourcemail letters to all Source subscribers in Hawaii, urging them to communicate with their legislators and oppose the software licensing act. He also offered the subscribers two memoranda he had written outlining the problems with the act.

Kutten's actions apparently were very effective. Hawaii Sen. Steven Cobb, chairman of the committee considering the legislation, called Kutten and told him that the bill was dead.

Illinois. Kutten was joined by computer lawyer Barry Bayer in a 1985 effort to defeat the Illinois version of the Software License Enforcement Act. The bill was supposed to be a "know-nothing bill," one Kutten said would pass easily. Instead, Kutten notes, "Pure hell broke out in Illinois" after he sent Sourcemail letters like those he sent in Hawaii to Source users in Illinois. He also sent letters to computer users groups in Illinois.

Kutten, an outspoken writer on consumer protection, explains his motivation succinctly. "I believe in morals and ethics," he says. "And I don't believe a small cadre of hired guns should be able to ride roughshod over the rights of the people." He calls the Software License Enforcement Act "The Consumer Rip-Off Act of 1985."

Meanwhile, Bayer was learning about computer politics for the first time. A member of a Chicago Bar Association committee on computers and law, he was aware of the software legislation from the committee's work on it. Convinced that the bill was a poor one, he went to Springfield, the Illinois state capital, to testify against it. His presence and behind-the-scenes contacts with legislators, users groups and the media kept the bill from being put on the legislature's consent calendar, which allows approval without serious discussion.

In the next week, Bayer got calls from legislators asking him if he would agree to language designed to make the bill agreeable and get it through the legislature. What he finally agreed to — and what eventually passed — was a bill "more symbolic than substantive." It provided for consumer protection and affirmed that nothing in the act should change the rights conferred on software users by the federal copyright act.

Perhaps in an attempt to divert attention or legislative energy, Bayer was instrumental in getting a bill introduced in 1986 that would have further weakened the 1985 Illinois shrink-wrap legislation. However, corporate users and developers who had been silent in the 1985 deliberations turned up to offer their help with this amendment, and the bill did not leave committee.

California. Attorneys played a major role in defeating the Software License Enforcement Act in California. Before the bill was introduced in the state, members of the Orange County Bar Association Patent Section and the State Bar Copyright and Intellectual Property Committee wrote letters to California Assemblyman Gray Davis, the bill's sponsor. Their strong opposition, raising many of the points previously addressed here, led Mercedes Azar, Davis' senior aide, to predict that the bill would never pass unless it became agreeable to the consumer. The bill was postponed until the 1986 legislative session, during which it was not reintroduced.

— JAY BLOOMBECKER

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Continued from page 58

representatives of personal computer, corporate and university users groups as well as software vendors, computer retailers and a representative from Molina's office.

After several meetings, the advisory board assembled a brief document titled "ADAPSO Guidelines on Packaged Microcomputer Software Warranties in the Absence of Negotiated Agreements." While far less demanding than the requirements of Molina's original proposal, the provisions of the board's document convinced her to defer action on a second version of the legislation.

Jane Windes of Molina's office says, "Within the next three months, we will find out which members of ADAPSO have made changes consistent with the ADAPSO guidelines, and we will examine the warranties they are now using." Molina is quoted as saying she prefers to see the software industry police itself.

> ***The Software License Enforcement Act is not primarily a piece of antipiracy legislation. It is special interest legislation designed to improve the economic position of software manufacturers without doing anything of substance to challenge software piracy.***

Users groups and legislation

Given the consistent success of individuals attempting to represent the interests of computer users, the natural question is, What success could groups of those users achieve?

In theory, users groups support educational activity, consumer protection and lobbying. Jon Seidell, head of the Independent Computer Consultants Association's Committee for Social Responsibility, explains the basic rationale for such activity: "Providers of computer goods and services are organized. Information users are not."

"We're philosophically behind the idea of involvement," says Jonathan Rotenberg, president of the Boston Computer Society. "We are committed to building an expanded program of outreach and public service."

"We should form lobbying groups to keep us aware of what is going on in the legislature," says Ned Ashby, president of the NOCC.

As for institutional users groups, the activities of ADAPSO and TESC indicate that corporate and other institutional users have begun to see the relevance of involvement in the legislative process. Increasingly, those in users groups can be expected to affect legislation if their groups choose to exercise the power available to them. Sturtevant makes no secret that he chose the members of the ADAPSO advisory board with a view to representing as many different groups as possible.

"It is not an accident that the group represents a geographic dispersion," he notes. "We tried to find all the constituencies we could and still be able to have manageable meetings."

ADAPSO's efforts are not unique. The Data Processing Management Association (DPMA) reportedly has established a committee to look into the issue of shrink-wrap licenses, says Joseph Collins, DPMA governmental affairs manager. "We've scheduled an article in the *Data Manager* [DPMA's membership magazine] to acquaint our members with the dimensions of the problems. Later we will be polling members to get a sense of their reactions to the issue."

Still, relatively few users groups, either on the individual or corporate level, are involved in attempts to influence computer policy issues. The theory of political involvement seems quite removed from the practice. Precious little seems to be happening to protect the rights of computer users. A number of reasons, listed below, may explain this difference between theory and practice.

Legal fears and apathy

Though favoring action, NOCC's Ashby notes that the nonprofit status of his and most other users groups made lobbying appear dangerous from the perspective of tax liability. Harris Luscomb, general counsel for the Boston Computer Society, explains that the Internal Revenue Code allows a nonprofit corporation spending $500,000 or less per year on exempt purposes to spend up to one-fifth of its expenditures on attempts to influence legislation. There is no limit on amounts spent simply acquiring information about legislation and disseminating it to the organization's membership.

Far more significant than legal fears seems to be the relative parochialism of most users group members' interests. NOCC's Beach waxes nostalgic thinking of the old days when hackers were the mainstay of computer users groups. "If something didn't work — and it often didn't — six of us would get together and work at it till we got it going," he notes. "Now we have 'appliance operators' who couldn't care less about how a product got to them or how it works."

The black box mentality of today's computer users seems to spill over into their attitudes toward politics, Beach says. "The appliance operators get a piece of software they

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don't understand from a vendor they don't trust. If it doesn't work, they just say, 'They [the vendors] did it to me again.' "

Since lack of interest may be a function of lack of information, efforts such as those of DPMA in alerting its members to the issues involved in shrink-wrap licensing laws are likely to be most useful.

Lack of issues

Several users group executives point to the lack of consumer protection laws affecting users as the reason that no action has been taken. Software licenses and warranties are not the only issues that affect the interests of individual and institutional computer users.

As computer crime concerns grow, more sophisticated bills dealing with the operation of bulletin boards — such as the Texas computer crime law and the pending New York and federal laws — address issues of significance to a large portion of the user community. MIS managers, given the task of making sure that all computers under their control carry explicit warnings that entry into the system is unauthorized except under certain circumstances (as the proposed New York law may require), will certainly find that legislation of great relevance.

Analogously, bills concerning taxation of software and conditions under which VDTs may or may not be used are likely to affect many computer users in dramatic, if not undesirable, ways.

Perhaps one of the reasons that more issues are not coming to the attention of users is that users have no one looking through the bills that are introduced to see if, indeed, any of these do affect them.

Lack of leadership

From Boston to Silicon Valley, users group representatives report that the questions of lobbying and consumer protection are frequent topics of discussion at board of director meetings. Why has this conversation not filtered down to the members?

Jerry Nightingale, executive director of the Silicon Valley Computer Club in Santa Clara, Calif., urges more leadership on this issue. "Sometimes members need to be led. There's not always demand for something until you give them something and then try to take it away."

Mark Silvergeld, director of the Consumer's Union, a nonprofit consumer affairs organization, suggests that if anyone is going to tackle consumer protection groups, it is not going to be the traditional consumer protection groups. "Consumer groups are grinding out the old basics," he says. "Intellectual property issues are too abstract for most consumer groups."

Mobilizing for change

One of the saddest ironies is the fact that users groups represent the disorganization of the computer community, despite the many tools for organization provided by computers, computer networks and bulletin boards.

"Considering that we all have computers, modems and word processing systems," Bayer says, "we should be able to turn out thousands of letters on an important issue. I can guarantee that 10 letters to a legislator will get him to think seriously about a bill."

Yet computer clubs are seen by many of their members, and even many of their leaders, as little more than umbrella groups for individual hardware, software or professional users groups, the interests of which tend to be technology- or profession-specific. With literally millions of members belonging to the varied users groups, it is truly astonishing that there is no vehicle for the groups' executives to communicate with each other about issues of common concern, be they legislative, practical or technical.

There is no reason for things to stay as they are. Here are five possibilities for change:

The goose-your-group letter. It is easy to assume that your professional association has things covered. Unfortunately, this assumption is often not correct. As ADAPSO responded to letters it received, so will your professional association react to the suggestions of its members. It is often the silence of the membership that keeps the leadership from pursuing new courses of action.

When I wrote earlier on this subject, it suddenly occurred to me that I was part of the problem I was describing. As a member of the Boston Computer Society, I had not done anything to make it responsive to the needs I thought important.

Self-enlightened — or at least guilty — I wrote a letter to Rotenberg proposing that the group study the possibility of gathering legislative information of interest to consumers and producers of computer goods and services as well as disseminating that information in a variety of ways.

Rotenberg wrote back supporting the proposal, suggesting that the society's Social Impact Group pursue it. After discussing the proposal with Anita Micossi, head of that group, we have agreed to propose that *Computer Update*, the society's magazine, retain the services of a legislative research group to provide monthly reports of new pending legislation.

In writing again on the topic, I raise the proposal once more. Clearly, legislative tracking is a function that a publication such as *Computerworld* could easily finance. All it requires is a flood of mail from readers of this article and a continuation of the publication's determination to serve its readership.

The computer users' consumer protection counsel. Why not institutionalize the good work that the people I have discussed have done? Let's

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get a group of volunteers who commit themselves to watch legislation that might affect computer users and to communicate their findings to users groups. I will bet there are 20 L. J. Kuttens who would be delighted to be working for the good of the entire computer user community, if only for a limited time period.

Expanded use of policy groups. If lobbying is worth doing, it is worth doing right. TESC provides a model of consumers working together that many other non-Fortune 100 corporations could emulate. There is always the possibility of adding to a single group's impact by joining with other users groups to meet with vendors and discuss issues of concern. For example, TESC does not involve itself in lobbying, but others could use the same structure TESC uses toward that end.

> ***Legislators are more ignorant than evil. Let them know that you oppose a bill, and they will listen. One or two people's input can make the difference.***

Where the issues are not of the vendor-buyer variety but involve legislative matters, the same groups can join forces for lobbying efforts, as, for instance, the Association for Systems Management and DPMA do. Assuming that a pilot volunteer project could demonstrate the value of lobbying, a serious, permanent commitment to the idea should follow.

Based on his experience, Bayer is currently exploring the possibility of creating a lobbying group in Illinois. "If you want to lobby, you have to be there full-time," he maintains. "We were clearly outsiders looking in."

Again, it is sadly ironic that computer users have taken so little advantage of the information processing resources that make lobbying remarkably quick and relatively cost-effective. Companies like Public Affairs Information, Inc. and Legi-Tech, both in Sacramento, Calif., offer a variety of information services based on their on-line data bases of all bills and regulations in the 50 states. They will provide, on request, access to their data bases, regular reports and copies of specific bills. Charges are quite negotiable and can be tailored to the needs of the user.

These companies and lobbyists such as DeHart and Darr Associates in McLean, Va., offer representations at the state capitals. Personal representation is more expensive but still follows the laws of economy of scale.

The world computer users group. The most ambitious proposal to empower computer users I have seen comes from California State University Professor Harold Sackman, the chairman of the International Federation for Information Processing Societies' (IFIPS) Technical Committee on the Relationship between Computers and Society.

IFIPS consists of 45 national and regional organizations representing national computer activities in 57 countries. Sackman has proposed that this organization develop and launch a World Computer Users Group. This group would include "diversified educational and legal support for individual consumers of computer services," he says.

According to Sackman, the group would be "aimed at cooperative and shared social development of mass computer services with computer industry regulatory bodies, information service vendors, local government, national government and international organizations."

There is every reason for corporate and other institutional users to band together with individual computer users on matters of mutual concern. As computing is democratized, the computer professional is already becoming a personal computer consumer anyway. There may be situations in which loyalties are divided between the role of consumer and that of corporate user, but certainly in many other situations the interests served will be the same.

Commitment to the process

As a participant in the legislative process, I can personally attest to the thrill of having the wind in your face that comes from doing good and getting results. In addition, my political involvement — and that of the others I have discussed — gives me a sense of security as a citizen in the computer age.

Legislators are more ignorant than evil. Let them know that you oppose a bill, and they will listen. As several of us have seen, just one or two people's input can make the difference.

If we are to take seriously the challenge of the computer age, we must expect that laws and regulations increasingly will focus on computers, communications, their uses and their users. The legislatures of our country can become the forum in which all those affected by these issues gather together to work out intelligent compromises.

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MACWORLD EXPOSITION BOSTON

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CORRECTION

The year of publication given for Edward Yourdon's *Nations at Risk*, excerpted in the July 21 In Depth, was incorrect. The correct year of publication is 1986.

MANAGEMENT

TAKING CHARGE
Charles A. Khuen

Using systems to step up sales

In the business-to-business world of heated global competition, intense price wars and rapid product obsolescence, the need for increased sales and marketing productivity has become critical.

More and more large U.S. companies are staking their futures on market knowledge, taking their strategic cues from customers rather than relying solely on input from research and development, engineering, manufacturing or finance.

A recent joint study on the marketing shape of U.S. corporations by Coopers & Lybrand and Yankelovich, Skelley and White, Inc. shows that as chief executive officers shift their focus outward rather than inward, they are beginning to tackle the complex challenge of launching sales and marketing into the information age.

The CEOs' new recognition of the importance of information-based sales and marketing presents MIS with a challenge and an opportunity. The challenge is both organizational and technical; those MIS executives willing to meet it have an unprecedented opportunity to make their services a strategic weapon for their corporation in the marketplace.

From the corporate standpoint, what is needed is a system that enhances the productivity of each individual sales representative and selling channel. This system must also leverage the pro-

See **USING** page 66

Khuen is president of Adelie Corp., which provides corporations with service, systems and support for sales and marketing productivity.

DP solves merger puzzles

Bank exec notes benefits in the economies of scale

By Stanley Gibson

BOSTON — Bank mergers do not happen when two data processing managers meet, find they have a lot in common and inform their respective presidents that it would be great if their banks merged.

Instead, data processing is usually called upon to fit together the pieces after a bank merger deal is completed. True to its nature, data processing is nearly always in a supporting role.

CIO L'Heureux

"Operations are not a critical part of bank [merger] discussions," says Philip F. L'Heureux, chief information officer for the Bank of New England Corp.

L'Heureux has played a pivotal role since Bank of New England NA completed its merger with Connecticut Bank and Trust Co., creating the Bank of New England Corp. in June 1985. He continues to quarterback DP support as the bank, now with $18.25 billion in assets, acquires more banks throughout New England. It acquired Maine National Corp. and Old Colony Bank of Providence, R.I., in December 1985. Currently, seven more acquisitions are awaiting regulatory approval; L'Heureux has a data processing action plan for each.

Although data processing was not a motivating factor in bringing about Bank of New England's mergers, DP economies of scale have already been an important benefit of the mergers. Both banks had projected large increases in staff, but a year later the DP payroll remains unchanged as consolidation has made an increase unnecessary. For Bank of New England, it is not a case of less is more, but rather, the same is more.

L'Heureux, 44, began his career as a programmer at Connecticut Bank and Trust in 1968. Before becoming chief information officer at Bank of New England, he was head of operations at Connecticut Bank and Trust. Immediately following the merger, he was appointed to the newly created position of chief information officer. His office, situated on the 36th floor of Boston's Bank of New England building, commands a panoramic view of Beacon Hill and the Charles River.

In a sign of the stature of data process-

See **DP** page 65

On-line service speeds translations

By Mitch Betts

To speed business transactions with foreign clients, a variety of companies have turned to an electronic mail service that provides on-line translation of documents.

Neil Wiggin, director of exports for J. H. France Refractories Co. in Snowshoe, Pa., knew the $12 million brick maker would need a translation service to help it penetrate international markets. "The value of translation was clear to us. We knew people were most comfortable doing business in their native language," he said.

But "it's like trying to find a needle in a haystack to find people who can do this kind of translation work," Wiggin noted. Consequently, he turned to a new service called Globalink that links professional translators with businesses through various electronic mail networks.

Globalink, a 1-year-old start-up company based in Oakton, Va., receives documents through electronic mail, telex, facsimile or modem and then routes them to free-lance translators in its network. The translated document is then sent to the Globalink operations center for quality control and routed to the recipient.

See **SERVICE** page 64

INSIDE

Calendar: Shows, conferences, seminars/**64**

INSTANT ANALYSIS

"The most successful applications of advanced office technology occur when users are taught how to operate the machines and are then left essentially on their own to figure out ways in which the technology can be applied to improve the handling of their jobs."

— John J. Connell, executive director, Office Technology Research Group

MANAGEMENT MEMO

Trends: Women's pay lagging; DP turnover 'whopping'

Women who work in information centers are consistently paid less than the men there, according to the 1986 Report on Information Centers, a survey by the American Management Association and *Information Center* magazine.

Among staff members, men's salaries average $38,700 and women's $30,400, according to the survey. For managers, men get an average of $46,600 and women $39,200, according to the survey.

The study found average pay to be $40,100 a year — $35,800 for staff and $44,500 for managers — for professionals at information centers, which provide training and support services for end users.

The survey also found information centers are growing to keep up with expansion of end-user computing, with more centers being created and existing ones getting bigger. It showed a 15% increase in information center start-ups over 1985. Respondents expect an average growth of 20% in staff, bringing the number of employees to an average of eight per center by year's end.

■

Information systems departments are not leading development of artificial intelligence, according to a pair of New Haven, Conn., consultants.

About 40% of the largest 500 companies are pursuing AI, but the work is usually led by advanced technology staffs, research and development departments or end users, according to Software People Concepts and AI Services Co.

Software People President Roger Sobkowia says the trend mirrors the introduction of data base systems, office automation and personal computers. "Again, it seems MIS is missing the boat," he says.

Information systems managers, by nature cautious, feel they have their hands full and view AI as novel, complex and costly, says George Hairston, president of AI Services.

■

Data processing pay and turnover are being pushed up by competition for qualified workers, according to another recent survey. Edward Perlin Associates, Inc. of New York puts the turnover rate at a "whopping" 17%, down a notch from last year's record 18%.

Managers are trying to cope by offering raises and promotions, according to Perlin. Among the 48 large companies surveyed, the cost of pay and incentives for data processing staffs rose 10%. The average entry-level salary is up 7.7% to $25,300.

A data processing shop with 400 workers could spend as much as $2 million a year on expenses related to staff turnover, says Perlin consultant Peter Tamblyn.

CALENDAR

AUGUST 10-16

AM/FM International Ninth Annual Conference. Snowmass, Colo., Aug. 11-14 — Contact: AM/FM International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

AAAI-86 Fifth National Conference on Artificial Intelligence. Philadelphia, Aug. 11-15 — Contact: AAAI-86, The American Association for Artificial Intelligence, 445 Burgess Drive, Menlo Park, Calif. 94025.

Data Communications: Fundamentals and Beyond. Boston, Aug. 13-15 — Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held Aug. 20-22 in Indianapolis.

Buying and Selling Rights to Software, Hardware and Services. Atlanta, Aug. 14 — Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Aug. 15 in Philadelphia, Aug. 18 in Boston and Aug.19 in Chicago.

AUGUST 17-23

Thirteenth Annual Conference on Computer Graphics and Interactive Techniques. Dallas, Aug. 18-22 — Contact: SIGGRAPH '86, Conference Management, Smith, Bucklin & Associates, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

The Institute on Artificial Intelligence and Expert Systems. Waltham, Mass., Aug. 18-22 — Contact: Joan Merrick, Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167. Also being held Sept. 29-Oct. 3 in Chicago.

Advanced Communications Architectures Seminar. Washington, D.C., Aug. 19-20 — Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

DEC: The Next Five Years. New York, Aug. 19-20 — Contact: The Yankee Group, Seminar Division, 14th Floor, 89 Broad St., Boston, Mass. 02110.

Second Annual Physical and Electronic Security Symposium and Exposition. Philadelphia, Aug. 19-21 — Contact: Michael C. Otten, Booz, Allen and Hamilton, Inc., 4330 East-West Highway, Bethesda, Md. 20814.

EDI Training Session. Arlington, Va., Aug. 21-22 — Contact: TDCC, 1101 17th St. N.W., Washington, D.C. 20036. Also being held Sept. 25-26 in Arlington.

AUGUST 24-30

The Third International Congress on Advances in Non-Impact Printing Technologies. San Francisco, Aug. 24-28 — Contact: Society of Photographic Scientists and Engineers, 7003 Kilworth Lane, Springfield, Va. 22151.

Interconnect '86. San Mateo, Calif., Aug. 26-28 — Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

Service speeds translations

From page 63

The service is available through a variety of electronic mail systems, including MCI Communications Corp.'s MCI Mail; Compuserve, Inc.'s Compuserve; Western Union Telegraph Co.'s Easylink; Readers Digest Association, Inc.'s The Source; and ITT Dialcom, Inc.'s Dialcom. A flat rate of 3 cents per character, plus $4 for handling, applies to all translations.

"We can get the information more rapidly to our customers," Wiggin said, "no matter where they may be in the world. Just yesterday I sent a letter to be translated from Spanish into English, and I had it back within an hour or so, translated and ready to go."

Typical translation services may take three days to translate a document and return it by mail or courier, but Wiggin said the on-line service achieves a turnaround time of an hour for most letters and 24 hours for lengthy, technical documents.

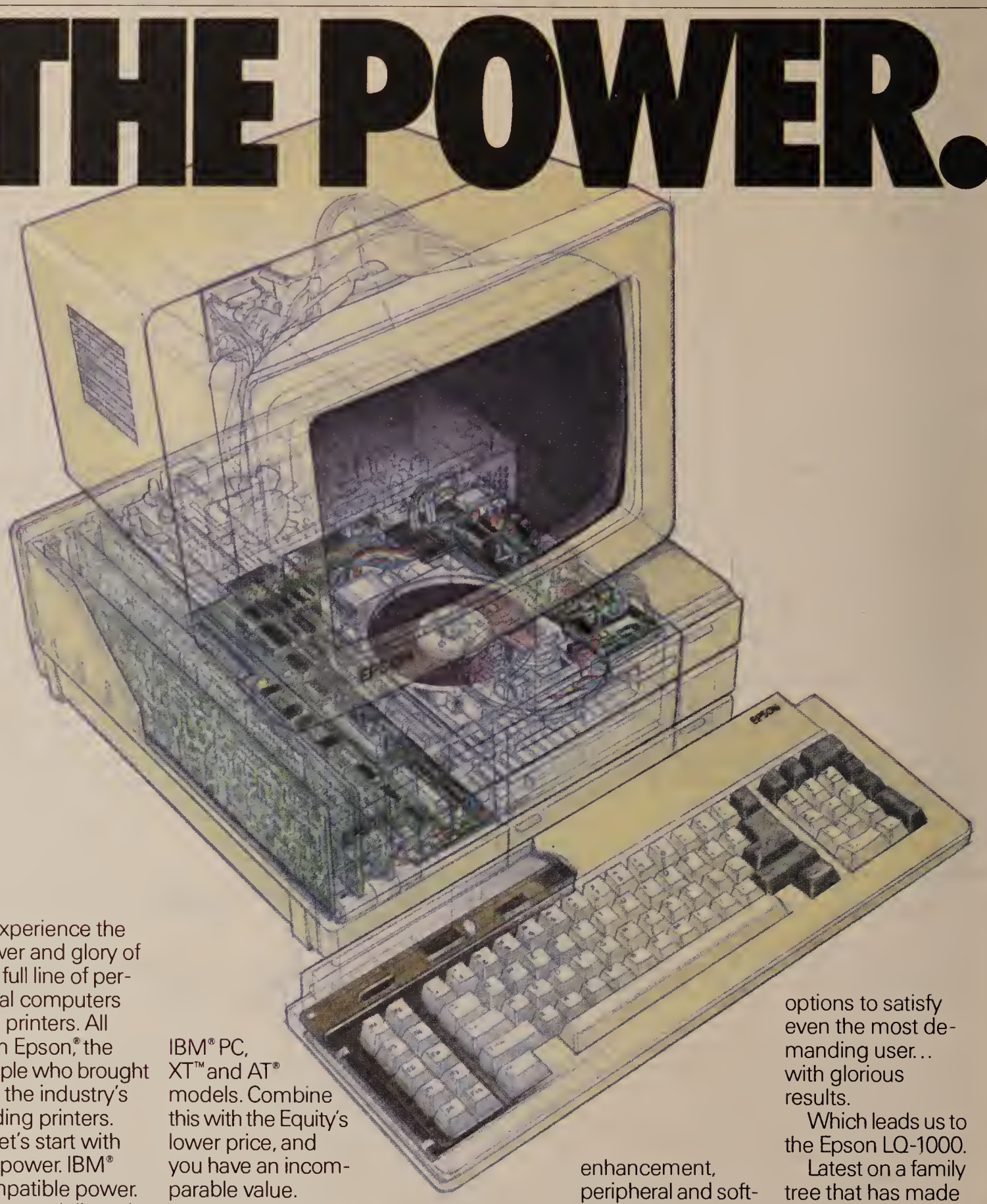
By speeding up business transactions, Wiggin said, the service gives his firm a competitive advantage over slow-moving rivals. Furthermore, using translated documents fosters clear and unambiguous business communications, he said.

"Many times there's a misunderstanding between people on contracts," he explained. "You ought to have the contract written in the language of the person who's going to be working with it. It's better to have it in their language to avoid misunderstandings," he said.

David Bremmer, an executive with the Spencer, Bennett, Nowak advertising agency in Seekonk, Mass., said he first used Globalink to handle technical ad copy. "It's important to be able to promise a client fast, accurate translations," he said. "It makes us look good."

Late last year, St. Louis-based Kangaroos, Inc., a footwear importer, recognized that its business with Italy was intensifying and required frequent translations of correspondence and legal documents, according to Richard Rosenberg, assistant director of marketing. "Through Globalink we are able to provide a special courtesy to our business with the Italians and other international contacts," he said.

THE POWER.



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DP solves banks' merger puzzle

From page 63

ing operations in the corporate hierarchy, the 36th floor is headquarters for the Bank of New England and houses the holding company's principal officers. L'Heureux's office is adjacent to that of John Carusone, senior vice-president of corporate planning, with whom L'Heureux works closely in devising merger strategy.

"We have a close personal and professional relationship," says Carusone, who was vice-president of strategic planning at Connecticut Bank and Trust when L'Heureux was head of operations there.

At the outset of merger discussions between Connecticut Bank and Trust and Bank of New England, officials of both banks agreed that neither bank would acquire a new piece of technology or software without discussing it with the other. "We knew the issue was standardization," L'Heureux says.

To develop a complete game plan prior to the merger, consultants from Arthur D. Little, Inc. of Cambridge, Mass., interviewed officials of various departments at the banks. They wrote up 18 short-term issues and recommendations, which resulted in a formal plan that was finalized in October 1985.

"You've got to have a plan and tie it into the strategic as well as the tactical plan of the bank," says George Rockwell, head of financial consulting at Arthur D. Little.

The plan determined that both banks had certain stengths that could be built upon. For example, Connecticut Bank and Trust had a strong retail and community banking culture and consequently was selected to be the DP headquarters for that area. Old Colony Bank was strong in mortgage banking and was chosen to be the center for that function. Bank of New England had been strong in commercial banking and therefore became the corporate headquarters for that activity.

"We're not closing down operations for the sake of consolidation but are trying to maximize the assets of each location," L'Heureux says.

The bank's two major data centers, each of which contains an IBM 3090, are in Malden, Mass., and East Hartford, Conn. There are additional centers in Rhode Island, western Massachusetts and Maine, and all are tied together with T1 lines.

With the establishment of the data centers and their specialties, the centers are managed in what L'Heureux calls a centralized-decentralized approach. Although the major planning is centralized, numerous details are left to each local center. "If someone wants to hire a programmer, they know best whether they should or not," L'Heureux explains. Purchases greater than $500,000, including the amount of projected savings, must be brought before a companywide committee.

One example of how the bank has made the same number of employees go further is the payroll department. Before the mergers there were nine programmers doing payroll, three in each of three locations. However, after locating the payroll center in East Hartford, the bank moved three people to join the three already there and shifted the other three payroll programmers to work on new DP projects.

The bank was able to draw on the experience of operating a successful computerized installment loan system in Connecticut to start up a similar system in western Massachusetts without hiring additional staff.

The bank achieved a major consolidation on June 15, 1986, when all the automated teller machines (ATM) of all the merged banks were tied together so that any cardholder could use any ATM in the system. In connecting the ATMs, a multivendor solution was required because of the different makes of machines at the various banks and the impracticality of replacing them.

Another consolidation will occur when L'Heureux chooses a companywide installment loan system to replace the six systems currently in place, which will greatly reduce the total software support burden, saving time and money, he says.

L'Heureux not only has to deal with the variables of the bank's strategic planning and such nuts-and-bolts issues as connecting various computers, but he must also handle personnel at an acquired bank.

'It's important not to be too disruptive'

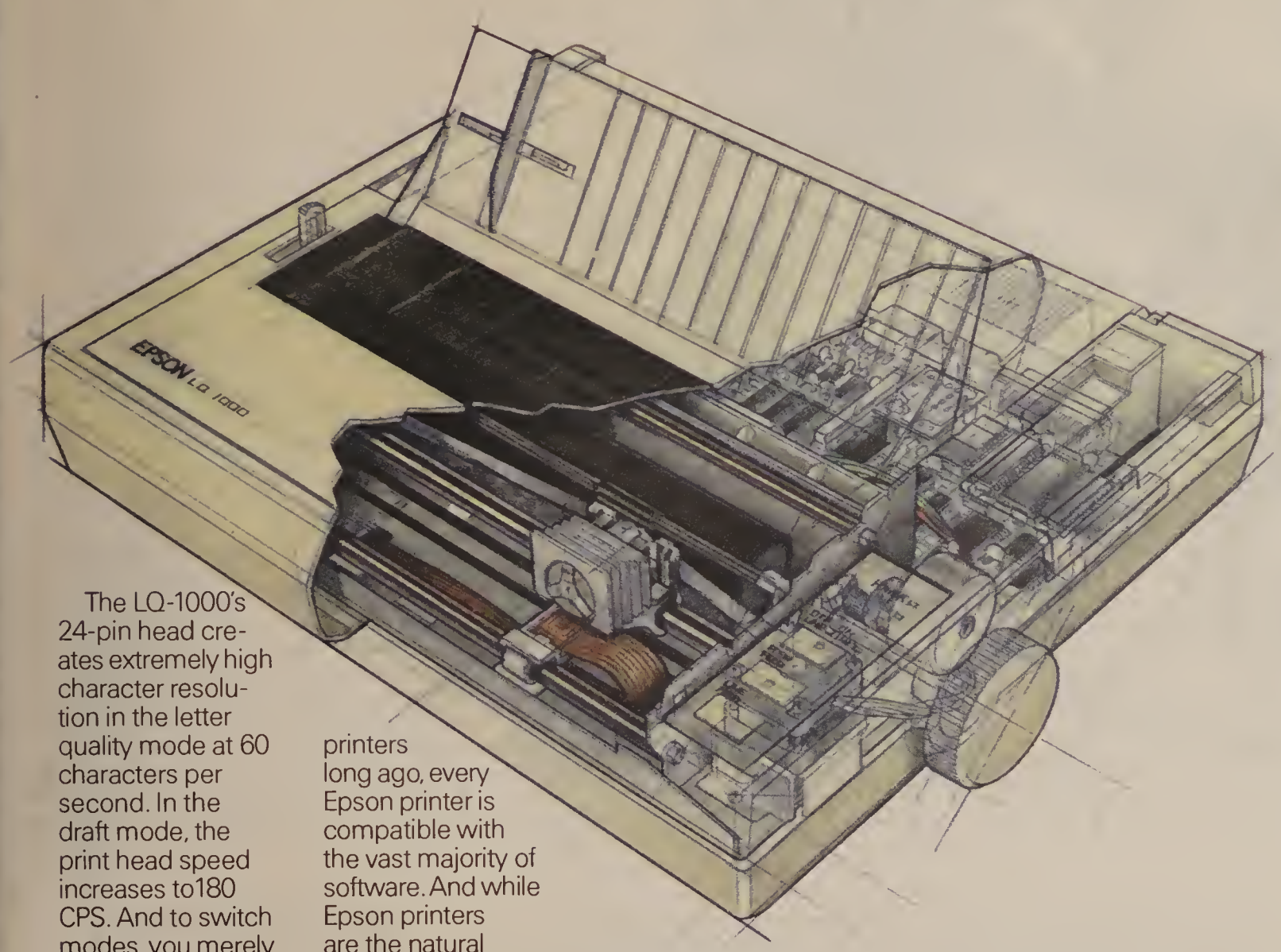
"Each bank is different. It's a very subtle thing, trying to understand the cultures. It's very important not to be too disruptive," Rockwell says.

An example of redirecting existing employees to advance corporate objectives occurred at Old Colony Bank. At the time of acquisition, the bank's old Sperry Univac mainframe was out of date and incompatible with Bank of New England's other systems. In addition, there were (and were expected to be) few Univac assembly language programmers in the Rhode Island area. The computer was sold, and mortgages are now handled by a service bureau in Dallas.

"There was apprehension at first," L'Heureux says of the employees' response to the changes in Rhode Island. However, all 12 Old Colony programmers are still employed in Rhode Island, working on projects for the Massachusetts or Connecticut data centers.

Not only does the move add to the bank's bottom line, but L'Heureux sees benefits for the programmers as well. After retraining as Cobol and CICS programmers, the switch gets them on a promising career path and out of dead-end positions programming the old Univac.

THE GLORY.



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EPSON
COMPUTERS
PRINTERS

Using systems to step up sales

From page 63

ductivity of all groups under the sales and marketing umbrella so that total corporate sales and marketing productivity can be optimized.

To achieve this goal, each group within the total sales and marketing operation — field sales, marketing communications, sales promotion, direct marketing, telemarketing and sales administration — must work together efficiently. All must share the information learned through each contact with the customer and leverage their actions for success. This approach allows the corporation to maximize the return on all its customer contacts.

The issue then becomes how to set up and implement a comprehensive central data base that the disparate groups within sales and marketing would be willing to use and share and that MIS could realistically be expected to support.

In addition to the challenge these intrafunctional barriers provide, other functional areas within the corporation should ideally be linked to sales and marketing. Although order entry, customer service and billing information exist at the corporate level, attempts to use that information for active marketing and sales have usually fallen short.

An integrated system designed to leverage sales and marketing productivity should incorporate four vital elements:

• The system must accommodate both centralized control and local ownership. Central control allows data backup and recovery and encourages operational discipline and reliability. However, local ownership is essential to winning the cooperation and participation of the field sales force.

• The system must offer both structure and flexibility. Structure, of course, is essential to facilitating the transfer of information in an orderly fashion. It also ensures that reports will be consistent over time. Flexibility is essential to allowing for quick response to changes in programs, territories and promotions and to supporting the ease-of-use features users demand.

• The system must focus on supporting — not managing — each of the participating departments. Big Brother systems designed to allow management to track sales performance tend to attract questionable data.

• It must be able to go on-line without requiring that sales and marketing organizations be reorganized or change their objectives.

While these characteristics sound difficult to realize and indeed represent a technical challenge, they can be achieved by combining the best of currently accepted personal computer, mainframe and communication technologies. The nature of such a system is not hard for an MIS director to envision.

It will offer networked, remote processing structured around a central marketing data base that operates on the corporate central mainframe. At the same time, it will be supported by operation-specific application software that meets the support needs of particular groups within sales and marketing.

Integration at work

Integration and the use of a central data base sets up a synergy cycle. In company after company, the more each department uses the system, the more information goes into the central data base and the better that central data base becomes. In turn, the more comprehensive the data base becomes, the more people use it and benefit from it.

Instead of overlap, confusion, delays and conflict, integration improves communication, boosts morale and lets everyone come out ahead in productivity and profits. When advertising and promotion personnel know the exact impact of each advertisement and trade show lead, higher returns on the advertising investment become possible.

At an instrumentation company, when sales representatives were supported with timely account status reports, customized personal letters for prospects and accurate lead assignments, they reported sales increases of more than 30% each and were able to handle nearly four times the number of accounts they had previously.

Automating sales and marketing also allows MIS to demonstrate its potential to develop a system that is in effect a corporate strategic weapon, one with an impact on both profitability and market share. Taking a leadership role in sales and marketing productivity improvement offers MIS the opportunity to implement corporate business objectives and, at the same time, gives corporate management the competitive edge needed in today's tough business environment.

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NEW PRODUCTS

Focus Vision stores, shows color pictures

Information Builders, Inc. of New York has announced Focus Vision, a personal computer data base management system said to capture virtually any image and display it as part of a PC/Focus data base record.

Focus Vision reportedly permits full-color pictures and graphics to be captured, stored and displayed along with standard text. The image can be made to be any size and can be placed anywhere on the screen. Video sources include camera, videocassette recorder, videodisk or compact disk.

According to the vendor, applications built with PC/Focus can add Focus Vision without having to be redesigned. Focus Vision also contains new Focus language commands that are said to be easily embedded in pre-existing applications.

Focus Vision is offered in two models, System 1000 and System 2000, both of which require PC/Focus Version 2.0 and an IBM Personal Computer AT or compatible computer, a 10M-byte hard disk and 640K bytes of main memory.

Focus Vision System 1000 is intended for capturing existing images produced by other software products and making them part of a PC/Focus data base. Focus Vision System 1000 software costs $750.

Focus Vision System 2000 reportedly will capture new images into the PC/Focus data base and will allow the capture, storage or display of live or prerecorded video images as well as images from other software in up to 256 colors.

System 2000 is available in two modes, capture and display and display only. The capture and display version of Focus Vision System 2000 requires the Focus Vision System 2000 software — priced at $995 — an AT&T Image Capture Master Board, a Quadram Corp. Palette Master board, two red-green-blue (RGB) analog monitors and a video camera and recorder. The display-only version of System 2000 requires Focus Vision System 2000-D software — priced at $395 — a Quadram Palette Master board and an RGB analog monitor.

PC/Focus Version 2.0 will reportedly be available at the end of the third quarter. Version 2.0 costs from $798 to $1,295, depending on quantity. Focus Vision will be available in the fourth quarter.

PBX capabilities enhanced

Messaging system cures office communication ills

Integrated Telecomputing Systems, Inc. of Sunnyvale, Calif., has introduced its Advanced Messaging System, said to provide Centrex users with private branch exchange capabilities.

The Advanced Messaging System, which also works with PBXs, consists of a full-featured telephone called Messagephone; the PC Message Attendant Station, a phone messaging system that can be linked to an IBM Personal Computer; and the Messagereader, a text-to-voice synthesizer installed in an IBM PC.

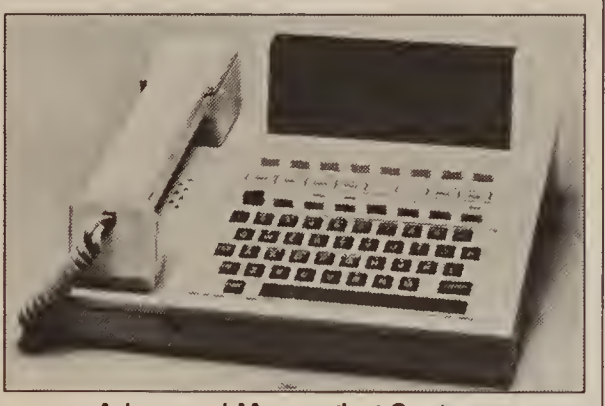
An optional interface, ITS/LAN, also is available.

The Advanced Messaging System is priced on a components basis, a company spokesman said. Messagephone costs $700 for one line with a modem and $800 for three lines with a modem. The Messagereader costs $4,000.

The Advanced Messaging System is intended to solve such office communication problems as telephone tag, misdialed numbers and unanswered calls. The system is designed to enhance the features of PBXs and Centrex services, making these features more accessible and easy to use, according to the vendor.

The Messagephone and PC Message Attendant Station are plug-compatible with most Centrex and PBX systems. Working with these systems, the Advanced Messaging System can perform advanced functions such as call transfers, conferencing, camp-on, call forwarding and call pickup.

According to the vendor, the core of the Advanced Messaging System is the Messagephone, a messaging telephone that can perform message storage and retrieval, automatic dialing of telephone numbers in messages, identification of incoming calls and automatic dialing of 200 or more preprogrammed phone numbers.



Advanced Messaging System

Messagephone also features a full keyboard with programmable keys, a three-line, easy-to-read vacuum fluorescent display and a built-in 300 bit/sec. modem. It also has 32K bytes of random-access memory, allowing storage of up to several hundred messages.

The system offers advanced messaging between Messagephones in the same office, allowing users to send memos and queries back and forth. Users also key in status messages, such as "out of office" or "back at 3 p.m.," and self-reminder notices that the system displays at preset times.

The Advanced Messaging System also offers voice mail capabilities through the Messagereader, which converts ASCII text into speech, said a spokesman from the company.

A special password keyed into the Messagereader by the user allows remote access to stored messages on a standard Touch-Tone telephone 24 hours a day.

Realfile expands PC file sharing

Realia, Inc. of Chicago has announced Realfile, an operating environment said to extend the file-sharing features of PC-DOS on the IBM PC Network and compatible networks.

Realfile supports sharing of indexed files among multiple machines. A central journal communicates task record locks, current positions and block alterations. Information in the journal allows Realfile to locally cache data from shared files.

Realfile reportedly minimizes network traffic, makes the most of local file caching and ensures the distributed caching behaves properly when multiple programs are accessing the same file, said Ken Belcher, Realia president.

The Realfile operating environment is priced at $150. A three-pack is available for $295. Future upgrades will be available for a per-copy upgrade fee. Realfile runs on the IBM Personal Computer, Personal Computer XT, AT, 3270 Personal Computer and compatible systems.

HP offers enhancements for Integral Personal Computer

Designed for EPROM placement of programs

Hewlett-Packard Co. of Palo Alto, Calif., has introduced three product enhancements for its HP Integral Personal Computer.

The enhancements feature the HP 82968A erasable programmable read-only memory/read-only memory (EPROM/ROM) board, the HP 82971A EPROM/ROM module and the HP 82970A software development tools.

The enhancements are said to allow the HP Integral PC to store C, Pascal, Fortran 77, HP technical Basic software programs or data files in EPROM, programmable read-only memory (PROM) or masked ROM.

Enhancements loaded into RAM

According to the vendor, the enhancements can also be loaded into the Integral PC's random-access memory (RAM), then executed. Turnkey secure systems can be developed for harsh environments as well as reliable software execution.

The HP 82968A EPROM/ROM board has sockets for four integrated circuits and is installed in the Integral PC's operating-system ROM module.

Holding up to 256K bytes of EPROM, the board is well suited for customers who want to place small programs, utilities, HP-UX scripts, data files or I/O drivers in EPROM, according to the vendor. The HP 82968A EPROM/ROM board is priced at $95.

With sockets for 16 customer-selected ICs, the HP 82971A EPROM/ROM module may be installed in either of the Integral PC's two I/O ports or an HP 82904A bus expander, the vendor stated.

The HP 82971A EPROM/ROM module costs $295.

The HP 82970A software development tools, priced at $195, include a software utility disk and a tutorial manual that give customers the ability to transfer programs or data files into EPROM, according to the vendor.

Software drivers are reportedly provided to communicate via the HP Integral PC HP 82919A RS-232C interface with EPROM programming devices such as a Data I/O Corp. Data I/O Model 29B.

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SOFTWARE & SERVICES

Systems software

Venturcom, Inc. has announced that its **Prelude Information Management System** supports AT&T's Unix System V Release 3.

Prelude is said to be a comprehensive system for developing software tailored to specific, data-intensive applications. When combined with Unix System V Release 3 remote file-sharing capability, Prelude can transparently distribute programs and data files across many computers from different vendors.

The Prelude management information system costs $1,800 for a two-user configuration license.

Venturcom, 215 First St., Cambridge, Mass. 02142.

■

Datanex, Inc. has introduced the **EZCom-3770** systems network architectural (SNA) remote job entry subsystem for Digital Equipment Corp.'s VAX/VMS and Microvax/MicroVMS systems.

EZCom-3770 is said to emulate IBM 3777 Model 4 SNA/RJE workstation functions and uses DEC interfaces such as the DMF32 synchronous port for VAX systems and the DPV-11 interface for Microvax.

EZCom-3770 costs $3,500 for Microvax and $7,500 for VAX systems.

Datanex, P.O. Box 1728, Eugene, Ore. 97440.

■

CFS, Inc. has announced **Release 6.7** of its **Display Operator Console Support** (DOCS) package for IBM mainframe sites.

One of the extensions provided in DOCS 6.7 is a command that displays job accounting data accumulated for each active partition, as well as summary performance data.

The other extension is a command that displays all or selected I/O units present in the DOS/VSE system.

Fields displayed include the channel and unit address of the unit and the volume serial number of tape or disk devices. DOCS 6.7 costs $7,610.

CFS, 1600 VFW Pkwy., West Roxbury, Mass. 02132.

Applications packages

McDonnell Douglas Information Systems Group has announced **Solid Modeller** and **Architectural Site Modeller** (ASM) architectural software packages for its Graphics Decision Systems product family.

Solid Modeller reportedly creates three-dimensional designs by combining geometric shapes and sweeping, revolving and extruding two-dimensional elements. It is priced from $10,000.

Architectural Site Modeller generates 3-D models of proposed building sites. It is priced from $10,000.

McDonnell Douglas, P.O. Box 516, St. Louis, Mo. 63166.

■

Control Data Corp. has added **Ed-Layout**, a printed-circuit board layout package to its Cybernet Express electronics workstation.

The Ed-Layout software is said to provide electronics engineers with the tools for creating, editing and documenting actual drawings necessary to build a printed-circuit board. Included in Ed-Layout are a number of utilities that speed board definition, placement of board parts and pin-to-pin routing of signals.

Ed-Layout costs $4,250.

CDC, 8100 34th Ave. S., Minneapolis, Minn. 55420.

■

Sun Microsystems, Inc. has announced that **Autocad Version 2.5**, Autodesk, Inc.'s two-dimensional computer-aided engineering, design and drafting software, is available on the company's Sun 3 family of workstations.

The Autocad Version 2.5 offering increases Sun's offerings in mechanical, architectural and engineering design to more than 80 third-party software and hardware products.

The Autocad software on Sun's 32-bit workstation is priced at $2,750.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.

Languages

Force Computers, Inc. has introduced a **Pascal compiler** under Unix, as part of its VME-based Unix V microforce series.

Pascal under Unix, said to generate fast and compact code, is enhanced by strict compile and runtime error checking. Features of the package include a source-level interactive debugger and Pascal profiler support to identify program bottlenecks.

A single unit license for Pascal under Unix costs $600.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

■

Whitesmiths, Ltd. has released **Version 3.0 RSX-11M Plus** C and Pascal compilers for the Digital Equipment Corp. PDP-11.

New ANSI features of Version 3.0 include structure assignment, structures-as-function arguments, functions-returning structures, void and volatile types and a complete ANSI C library.

Additional features include C source-level interactive debugging with breakpointing and variable display and operating system-specific library functions in source-code form.

Version 3.0 RSX-11M Plus costs $1,000 and $1,300 with Pascal.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

If the space program had advanced as fast as the computer industry, this might be the view from your office.

And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, stood two stories high, covered 15,000 square feet, and cost $486,840.22 in 1946 dollars. Today a $2,000 portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.

The collective brainpower of computers sold in the next two years will equal that of all computers sold from the beginning to now. Four years from now it will have doubled again.

It's hard to remember that this is scientific fact, not fiction. How do people keep pace with change like this? That's where we come in. We're CW Communications/Inc. — the world's largest publisher of computer-related newspapers and magazines.

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Nobody reaches more computer-involved people around the world than we do. And nobody covers as many markets. In the United States we publish three computer/business journals. *Micro Marketworld* is published 24 times a year for businesses reselling small computer systems and software. *Network World* is the first and only newsweekly for users of data, voice and video communications products and services. And *Computerworld*, the newsweekly for the computer community, is the largest specialized business publication of any kind in this country.

NEW PRODUCTS/SOFTWARE & SERVICES

Utilities

Plum Hall, Inc. has introduced the **Plum Hall Validation Suite**, a set of C programs for testing and evaluating C compilers and interpreters.

The Plum Hall Validation Suite for C was designed to test functioning of required features. The first subsection evaluates language features, and the second subsection tests operator precedence.

Other features of the product include a compiler capacity test, an executive interpreter that is a script language processor, expression generator and coverage.

Source license fees for up to 20 programmmers are priced at $4,500; the conformance section alone costs $2,200.

Plum Hall, 1 Spruce Ave., Cardiff, N.J. 08232.

A graphics and technical analysis system called **Teletrac** has been announced by **Telerate, Inc.**

Said to function on a specially designed microcomputer, Teletrac is a front-line trading and analytical tool for users in the foreign exchange and fixed-income money markets. Teletrac is received over high-speed satellite or leased telephone lines or can be piped into video switching systems.

Teletrac leases for $960/mo for color monitor and $795/mo for monochrome monitor.

Telerate, One World Trade Center, New York, N.Y. 10048.

■

Computertime Network Corp. has introduced **Dialogue**, a set of products said to allow access to Record Management System files on Digital Equipment Corp. VAX or Microvax computers through the use of screen forms.

With Dialogue, users can create screen forms, menus and reports. Programmers can use Dialogue's library of subroutines to facilitate I/O. Dialogue programs can be used as subroutines called from third-generation language programs or by themselves for file maintenance.

Dialogue costs $2,000 on Microvax, $10,000 on a VAX 750 or 780 and $23,500 on a VAX 880.

Computertime Network, 400 Amherst St., Nashua, N.H. 03063.

■

Versatec, Inc. has announced **Integrated Versaplot 9.2**, plotting software for outputting data from Prime Computer, Inc. computers.

Output can be to a magnetic tape or Versatec monochrome or color plotter. Integrated Versaplot 9.2 offers Prime users pen-plotter program call capability through Fortran-callable subroutines, user-adjustable clipping window and plotting viewport and support of Versatec 511A output multiplexer for use of multiple plotters.

Integrated Versaplot costs $4,000.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

Training software

Advanced Systems, Inc. has introduced **Displaywrite III, Course 6265**, a program for understanding Displaywrite III word processing.

The first of four Course 6265 video modules defines word processing and guides students through the creation of a document. The second module addresses revision functions as well as text formatting.

The final two modules teach the use of tables, math footnotes, spelling checking, repetitive documents, merge printing and special Displaywrite III features.

The program runs on IBM Personal Computers or compatibles.

The Displaywrite III course rents for $50 a month to $150 a month per module.

Advanced Systems, 155 E. Algonquin Road, Arlington Heights, Ill. 60005.

■

Martin Marietta Data Systems has announced **PC/Ramlearn Basic Reporting**, a training package for its Ramis II fourth-generation language and data base management system.

PC/Ramlearn includes courses on understanding the reporting environment, methods of data selection, displaying totals and subtotals and the basic Ramis II report request.

PC/Ramlearn runs on IBM PC-DOS or Microsoft Corp. MS-DOS Version 2.0 or higher.

It runs on IBM Personal Computers or compatibles with 192K bytes of memory with a color display and color graphics adapter.

PC/Ramlearn Basic Reporting costs $5,000 for duplication of up to 25 copies and $15,000 for up to 100 copies.

Martin Marietta, P.O. Box 2392, Princeton, N.J. 08540.

Services

The **Society of Manufacturing Engineers** and the **Industrial Technology Institute** have announced the publication of a **directory** of vendor products said to conform to Manufacturing Automation Protocol (MAP) and Technical and Office Protocol (TOP) specifications.

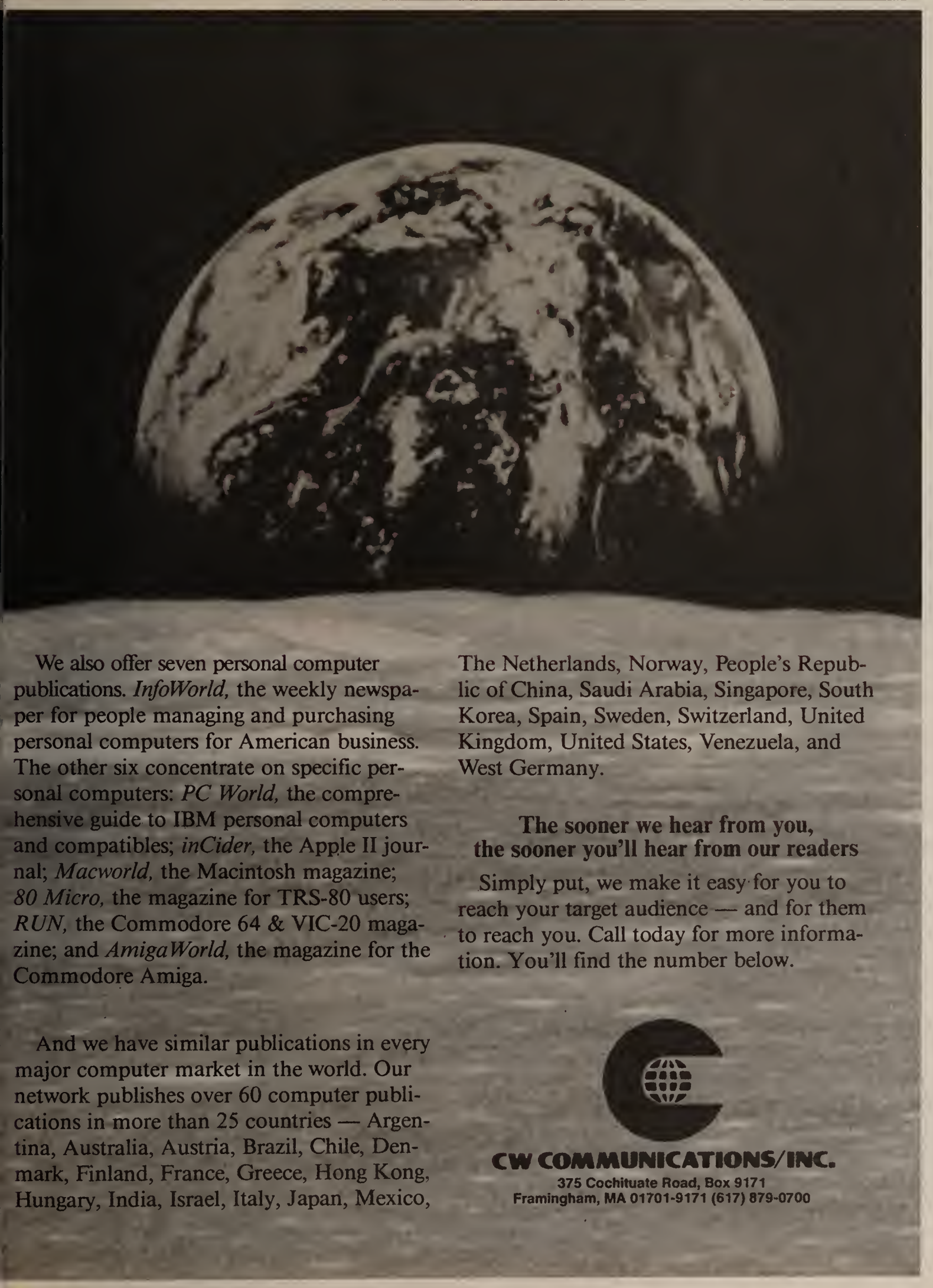
Products listed in the directory are categorized by end systems, intermediate systems, original equipment manufacturer products, gateways, network products and network services.

Each listing includes such information as a vendor contact, the protocols implemented and the intended operating environment.

Subscriptions cost $135.

An on-line data base is also available.

Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.



We also offer seven personal computer publications. *InfoWorld,* the weekly newspaper for people managing and purchasing personal computers for American business. The other six concentrate on specific personal computers: *PC World,* the comprehensive guide to IBM personal computers and compatibles; *inCider,* the Apple II journal; *Macworld,* the Macintosh magazine; *80 Micro,* the magazine for TRS-80 users; *RUN,* the Commodore 64 & VIC-20 magazine; and *AmigaWorld,* the magazine for the Commodore Amiga.

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MICROS

Systems

Tandy Corp. has added the **Tandy 102** portable computer to its line of personal computers.

The Tandy 102 features a full-size 56-key typewriter-style keyboard with eight programmable function keys, four command keys and four cursor control keys.

Other features include a 40-char. by 8-line LCD display, 24K bytes of random-access memory and internal 300 bit/sec. direct-connect autodial modem.

The 102 includes five built-in read-only memory software programs for text editing, address and telephone filing, appointment record keeping, telecommunications and Basic language programming.

The Tandy 102 is priced at $499.

Tandy, 1800 One Tandy Center, Fort Worth, Texas 76102.

■

Comark Corp. has introduced the **Expert-AT workstation**, an IBM Personal Computer- and Personal Computer AT-compatible computer system.

Expert-AT has eight expansion slots, 640K bytes of random-access memory, 200W power supply and passive heat exchanger, the vendor said.

The workstation features a 19-in. red-green-blue monitor with 16 colors, 640- by 350-pixel medium-resolution display and full travel membrane keyboard with 10 function keys, according to the vendor.

The unit also provides tilt and swivel control.

The Expert-AT workstation is priced at $6,495.

Comark, P.O. Box 474, 93 West St., Medfield, Mass. 02052.

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If the microcomputer revolution has you manning the data center barricades, it's time to install Arbiter,™ and declare peace.

Much more than a micro-to-mainframe "link," Arbiter is a Co-operative Processing Subsystem. It operates as a VTAM application, capable of supporting hundreds of PCs without interfering with the performance of your essential development and production subsystems. It is fully compatible with SNA, with a carefully planned growth path into IBM's® LU6.2.

Arbiter interfaces directly with VTAM and executes in its own address space, where it presents none of the performance or integrity exposure problems associated with CICS- or TSO-based link products.

Because Arbiter is a VTAM application, there are fewer layers of software between the PC user and the information, saving processor overhead. Arbiter's advanced data compression scheme also saves valuable network resources.

As a subsystem, Arbiter fully supports RACF and other popular security packages. It also feeds data into IBM's SMF–data you can use to tune Arbiter. Or use for network capacity planning, usage accounting and auditing.

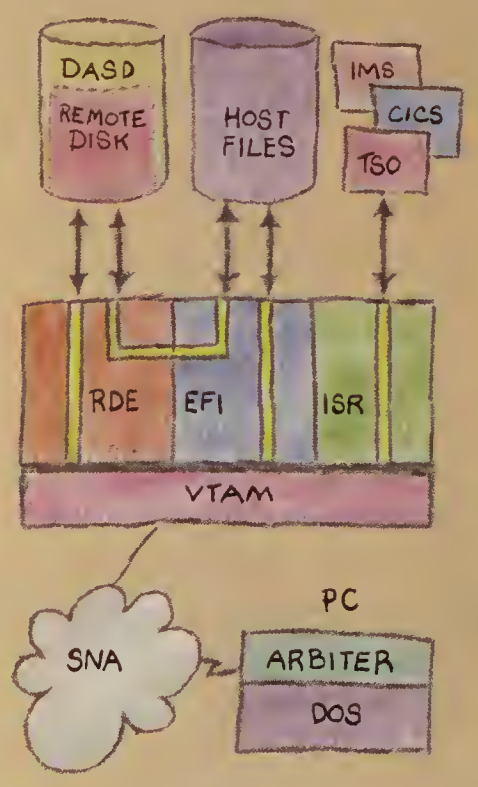
Instead of time-consuming file transfers and data reformatting, Arbiter allows the PC user to access corporate data via remote disks–already formatted for Lotus 1-2-3,® dBASE II® or III,® or other popular software in formats like WKS, DIF® or CSV. Remote disks are accessed exactly like the disks attached to the PC.

Arbiter enables your information center to extract data from any host-formatted file structure (e.g., IMS, DB2 or VSAM) using its existing tools, whether they're COBOL, Pascal, PL/1, SAS® or FOCUS.®

Arbiter is licensed for a fixed fee based on the mainframe processor. PC licenses entail no additional charge and there is no limit to the number of PCs that can be attached to the licensed mainframe.

Introductory pricing is currently in effect for a limited time period.

Now's the time to give peace a chance in your data center by calling Tangram today at **(919)481-4444.** You can declare an immediate truce by trying Arbiter yourself at your installation, with no obligation.



Arbiter has three components. The Remote Disk Environment (RDE) provides a seamless interface to remote disks on the host, which may be accessed by PC users or host application programs. The External File Interface (EFI) transfers data to and from files on the host and the remote disks. The Interactive Session Relay (ISR) allows "power users" to connect a PC to another mainframe subsystem–for example, TSO or CICS–without disconnecting from Arbiter.

TANGRAM SYSTEMS CORPORATION

Tangram Systems Corporation
118 MacKenan Drive, Suite 100
P.O. Box 5069
Cary, NC 27511-1999
(919) 481-4444

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Software applications packages

Computer Technology Associates, Inc. has released **Performance Analysis Tool Box**, a personal computer-based performance modeling tool.

Users direct Performance Analysis Tool Box to describe the hardware, software, communications and work load characteristics of the system to be modeled. Performance Analysis Tool Box uses analytical queueing network algorithms and approximation techniques to solve the system model. Reports including work load throughput and response time may be obtained through the Performance Analysis Tool Box.

Performance Analysis Tool Box costs $10,000.

Computer Technology Associates, Suite 600 W., 7927 Jones Branch Drive, McLean, Va. 22102.

■

Diagonal Data Corp. has introduced **Maintlog**, a software module that interfaces the vendor's Micro Maint plant maintenance software package with Centec Corp.'s personal computer-based, computer-aided manufacturing management (CAMM).

The Maintlog interface is said to allow Micro Maint to process CAMM-developed equipment log files to determine the need for specific maintenance to be performed on the equipment being logged. When a condition requiring maintenance is detected by the CAMM system, Micro Maint then generates an appropriate work order.

The Maintlog interface module costs $550.

Diagonal Data, 2000 E. Edgewood Drive, Lakeland, Fla. 33803.

Software utilities

Popular Programs, Inc. has released **Pop-Up PC-12C Calculator**, a random-access memory-resident calculator.

Pop-Up PC-12C Calculator is said to emulate Hewlett-Packard Co.'s 12C calculator. The calculator is a desk tool program for IBM Personal Computers and compatibles.

The Pop-Up PC-12C calculator is priced at $69.95.

Popular Programs, Suite 180, 135 Lake St., Kirkland, Wash. 98033.

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(312) 790-5040

NEW PRODUCTS/MICROCOMPUTERS

Software enhancements

Bay Computer Corp. has announced its **PC/Audit Version 3.5** card for password protection and automatic logoff of IBM Personal Computers tied to a mainframe or network.

According to the vendor, if the PC/Audit senses no activity on the keyboard of a PC after a certain period of time, the card will automatically break the link with the mainframe. Additionally, the PC/Audit will provide the system manager with a detailed audit of all computer usage, including files accessed.

The PC/Audit card costs $239.

Bay Computer, York & Haverhill Sts., Andover, Mass. 01810.

■

Microhelp, Inc. has announced **Peeks 'n Pokes Version 3.1** and the **Inside Track Version 3.1** software programs for IBM Personal Computers and compatibles.

Peeks 'n Pokes Version 3.1 includes such functions as reading and changing the system configuration, determining the total space and unused space on a disk and accessing the printer status.

Inside Track Version 3.1 includes such functions as how to display data faster, how to control the keyboard and how to copy memory from one location to another.

Peeks 'n Pokes Version 3.1 costs $45, and the Inside Track Version 3.1 costs $65.

Microhelp, 2220 Carlyle Drive, Marietta, Ga. 30062.

Communications

Emulex Corp., has announced **DCP/MUX**, a communications coprocessor board that expands the multiuser capability of IBM Personal Computer ATs, RT Personal Computers and compatibles.

The DCP/MUX works by incorporating an on-board Intel Corp. 80286 microprocessor that allows the board to off-load processor-demanding terminal communications.

Features of the DCP/MUX include an on-board interval timer that supports three 16-bit counters and a configurable 16- to 64K-byte shared memory window.

The four-line 128K-byte DCP/MUX costs $1,250; the eight-line 128K-byte DCP/MUX costs $1,495, the vendor said.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

■

Lattice, Inc. has announced **Sidetalk**, a package of telecommunications programs plus a communications programming language.

Sidetalk includes telecommunications programs to retrieve electronic mail, schedule automatic data transfers and set up a bulletin board system. A multitasking operation allows users' telecommunications to to be managed while the computer performs other tasks.

The Sidetalk Communications Language, similar to Basic, can be used to modify or create customized communications processes.

Sidetalk requires Microsoft Corp. MS-DOS or IBM PC-DOS 2.0 or higher and one serial port. It costs $119.95.

Lattice, P.O. Box 3072, Glen Ellyn, Ill. 60138.

Data storage

Torus Systems, Inc. has announced its **Cacher** disk-caching program.

According to the vendor, Cacher monitors all hard-disk activity and automatically caches all data transferred to or from the disk in up to 8M bytes of cache memory.

The program is compatible with the IBM Personal Computer XT and AT.

Cacher costs $99.

Torus Systems, Suite 105, 495 Seaport Court, Redwood, Calif. 94063.

■

J & M Systems, Ltd. has announced its **10M-byte hard drive kit** for the Tandy Corp. 1000 system.

The user-installable kit consists of a 10M-byte Winchester drive, controller, cables, mounting hardware and installation manual. All components are mounted internally, with the drive being mounted in the second floppy drive position.

The system requires IBM PC-DOS 2.1 or higher.

The hard drive kit for the Tandy 1000 costs $495.

J & M Systems, 15100-A Central S.E., Albuquerque, N.M. 87123.

Printers/Plotters/Peripherals

Summagraphics Corp. has introduced the **Professional series**, a graphics tablet featuring a full 18-in. by 12-in. active area.

The Professional series offers 1,000 line/in. resolution and features an interface cable, power supply and documentation. It utilizes the capabilities of graphic software packages such as Autodesk, Inc.'s Autocad and Versacad.

The Professional series tablet can be used with the IBM Personal Computer and compatibles and Apple Computer, Inc. Macintosh computers.

Professional series packages cost $995.

Summagraphics, 777 State St. Extension, Fairfield, Conn. 06430.

COMMUNICATIONS

Controllers

Renex Corp. has announced its **RTD** unit asynchronous communications controller, said to support dual hosts.

RTD permits communication be-

Continued on page 72

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Continued from page 71

tween large and small IBM systems and between IBM and other manufacturers.

Features include the ability to support seven colors, auto bit/sec. rate detection and up to five sessions per port. The basic unit supports terminal emulation of IBM 3270 terminals.

RTD is offered in eight- or 16-asynchronous port models.

The RTD unit ranges in price from $4,800 to $6,400.

Renex, 1513 Davis Ford Road, Woodbridge, Va. 22192.

Software

Tektronix, Inc.'s Software Development Products division has announced **ICom40/Apollo** for Apollo Computer, Inc. workstations.

ICom40/Apollo is said to allow communication between the Apollo Version 9 and the Tektronix 8540 and 8540A integration units, permitting a user to enter 8540 commands into and receive 8540 output from the Apollo workstation.

With ICom40/Apollo and Apollo-hosted compilers and assemblers, a user can perform high-level and low-level debugging from his workstation using the features provided by the host operating system.

The ICom40/Apollo package costs $2,000.

Tektronix, P.O. Box 14752, Portland, Ore. 97214.

Multiplexers/Modems

Algo, Inc. has announced its **Algo MC610** statistical multiplexer.

Algo MC610 is said to be a statistical multiplexer, a resource sharing switch and a data concentrator capable of supporting up to 500 local or remote asynchronous user stations.

The MC610's switching features make it possible for any RS-232 device to dynamically connect to any other local or remote RS-232 device. The MC610 with six ports in single quantity costs $1,495.

Algo, 9198C Red Branch Road, Columbia, Md. 21045.

■

Lantel Corp. has introduced its **Series 900 modems** including the **192CRU, 900A, 900S, 900T** and **900DC** broadband products for networks using 192.25 MHz as a translation frequency.

The 192CRU central retransmission unit is a single-channel frequency translator available for five video channels from 83.75 MHz to 113.75 MHz. It costs $1,490. The 900T and 900DC analog voice modems can interface two single-line telephones or connect a single-line phone to a private branch exchange. Each costs $880.

The 900A data modem offers asynchronous communications at 9.6K bit/sec. The 900S can operate either as an asynchronous or synchronous unit and offers operation from zero to 19.2K bit/sec. The 900A costs $780, and the 900S costs $980.

Lantel, 3100 Northwoods Place, Norcross, Ga. 30071.

■

Hewlett-Packard Co. has announced its **Digital Multiplexed Interface** (DMI) link product.

The HP DMI allows the HP 3000 to connect 23 RS-232C ports, at rates up to 19.2K bit/sec., to the private branch exchange network via a single T1 interface running on small-diameter telephone cable.

According to the vendor, the HP DMI eliminates the need for individual RS-232C connections by using data modules between the HP 3000 and the PBX.

The product costs $9,300.

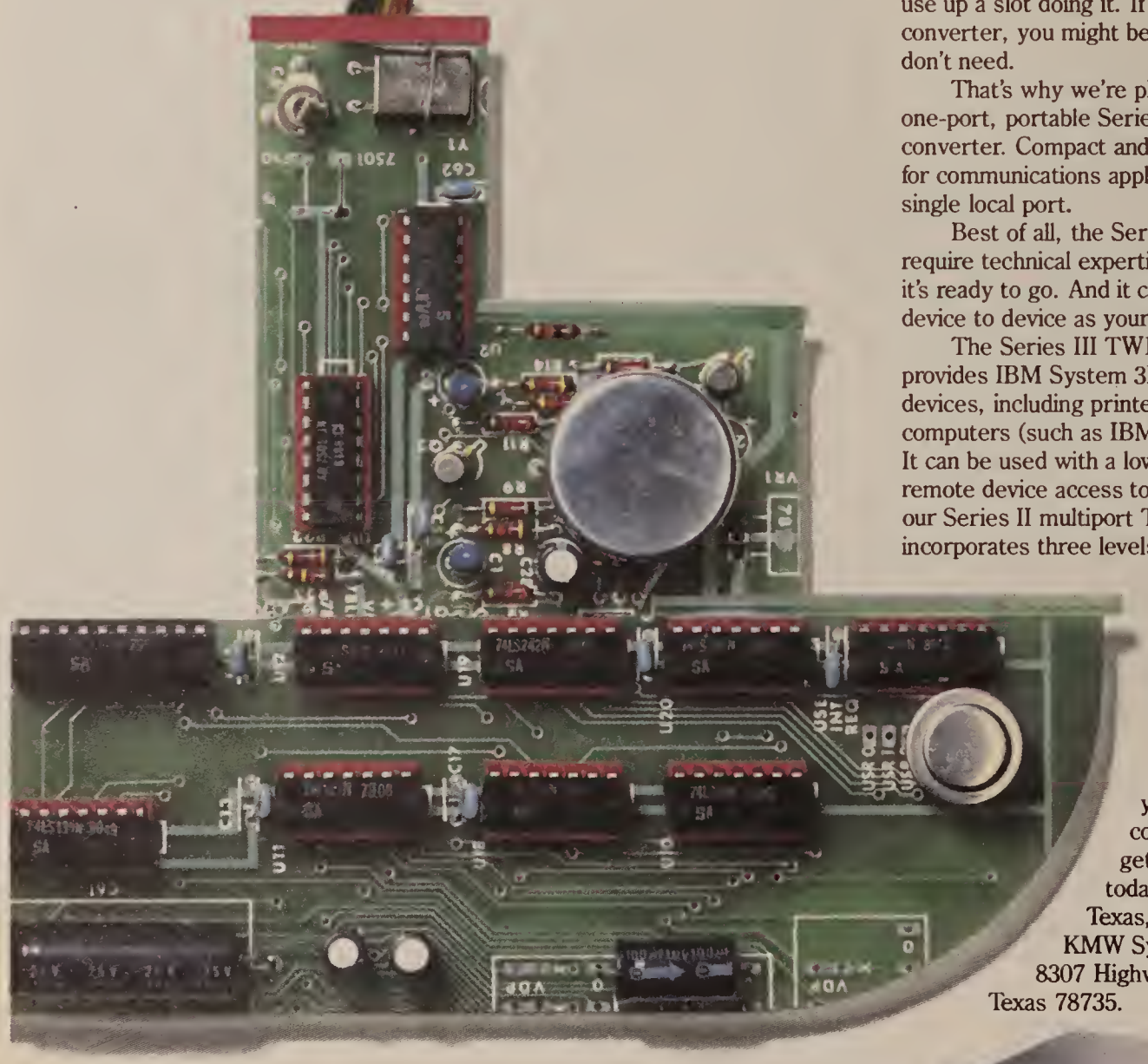
HP, Inquiries Manager, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Network services

Western Union Corp. has added the **TRW Business Credit on-line data base** to its Infomaster service.

The TRW Business credit addition is said to provide access to credit information and key business information on eight million business locations, allowing them to check payment history, per-

To make the right protocol connections, don't get a board.



Each time you connect a PC or peripheral to your IBM System 34, 36 or 38, you face a dilemma. If you buy a board level protocol converter, you have to install it yourself — and use up a slot doing it. If you buy a multiport converter, you might be paying for ports you don't need.

That's why we're pleased to announce our one-port, portable Series III TWINAX protocol converter. Compact and affordable, it's perfect for communications applications that require a single local port.

Best of all, the Series III converter doesn't require technical expertise. Simply plug it in and it's ready to go. And it can be moved easily from device to device as your needs dictate.

The Series III TWINAX converter provides IBM System 3X connections for most devices, including printers, CRT's and microcomputers (such as IBM, Wang and Macintosh). It can be used with a low cost modem to give a remote device access to the 3X as well. And like our Series II multiport TWINAX converter, it incorporates three levels of internal diagnostics, menu-driven programmability, printer passthrough, file transfer and 25th status line capabilities.

So now, you can take care of virtually all your single port protocol connections without getting a board. Call us today at 1-800/531-5167 (in Texas, 512/836-8080) or write KMW Systems Corporation, 8307 Highway 71 West, Austin, Texas 78735.

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formance and stability of current and potential customers or suppliers. The TRW Business Profile reports are continually updated.

Each TRW Business Profile is available for $33, including a $25 surcharge and the standard $8 Infomaster service search fee.

Western Union, One Lake St., Upper Saddle River, N.J. 07458.

■

Network Technologies International, Inc. has released **National Health Forum**, a collection of information systems and services for the health care industry.

National Health Forum provides nationwide computerized information on hospital cost, quality of care, financial performance, population demographics and health services utilization.

The National Health Forum system incorporates an electronic conferencing utility that allows scattered participants to share and evaluate critical organizational analyses.

The National Health Forum system costs $12,000 plus remote computer service charges.

Network Technologies International, Suite 280, 315 W. Huron St., Ann Arbor, Mich. 48103.

Test equipment

Tekelec has announced the **Quasi Random Signal Source** (QRSS) option for its TE820A T1/DS1 test system.

The QRSS option is a plug-in card said to enable testing of data and voice equipment to ensure the integrity of the TE820A test system.

The QRSS option transmits known patterns through the DS1 equipment and compares the received pattern to the original. If errors have been introduced into the original pattern, the TE820A will supply a bit-error count that can be displayed as either error rate, individual errors or errored seconds.

The QRSS option costs $1,500.

Tekelec, 26540 Agoura Road, Calabasas, Calif. 91302.

■

Phonetics, Inc. has introduced the **Sensaphone Computer Monitoring System**.

The Sensaphone Computer Monitoring system sounds an alert if there is any threat of damage to an unguarded system and automatically calls up to four phone numbers to report the alert condition in English.

The Sensaphone system also responds with a status report on the six conditions it has been programmed to monitor, such as temperature, power supply, air conditioning, water under the floor or intrusion.

Sensaphone Computer Monitoring system ranges in price from $250 to $500.

Phonetics, 101 State Road, Media, Pa. 19063.

Auxiliary equipment

Electro Standards Laboratory, Inc. has introduced its **Model 8874-D IEEE 488 ABCD Switch** for switching devices having IEEE 488 interface.

The Model 8874-D is said to allow the user to switch a device having an IEEE 488 interface to any one of four IEEE 488 ports or switch any one of four devices into one port. All 24 leads of the interface are transferred simultaneously by operating the front panel selector switch. All cable connections are made at the rear panel.

The Model 8874-D costs $220.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

■

Dynapac has introduced the **Multi-Log X.25** monitoring device.

The Multi-Log X.25 is said to monitor packet-level data frames and produce statistics on calls made and data transferred during these calls. Output statistics such as calling address, incoming/outcoming call, reverse charges, date, time and duration are given, according to the vendor.

Multi-Log X.25 can handle a maximum of 20 calls. Multi-Log X.25 statistics are produced in one of two optional formats and are output from an RS-232 port for connection to a computer system or printer.

Multi-Log X.25 is priced at $2,995.

Dynapac, 6464 General Green Way, Alexandria, Va. 22312.

■

Electronic Specialists, Inc. has introduced the **Model PDS-11/Sup** Kleen Line modem protection.

Kleen Line security systems are said to suppress damaging telephone and power line spikes caused by lightning, spherics or phone office switch gear.

Model PDS-11/Sup has suppression on red and green phone lines with yellow and black lines brought straight through. A 6500A suppressor protects the AC power line.

Kleen Line Models are available for standard RJ-11 and RJ-45 modular connectors.

The Model PDS-11/Sup costs $109.05.

Electronic Specialists, 171 S. Main St., Natick, Mass. 01760.

■

Mod-Tap System has introduced its **Modular IBM Adapters**.

The Modular IBM Adapters are said to allow the user to convert the IBM Cabling System to standard twisted-pair wiring through modular connectors. The Modular Adapters are available with either a modular jack or a modular plug.

Continued on page 74

Design refinements cut size, cost and power consumption for 4800bps modems

Additional LSI microminiaturization in UDS' 208A/B modems has produced significant performance improvements, along with dramatic reductions in size and power consumption. The 208A/B can be strapped as either full-duplex, four-wire (half-duplex, two-wire) over dedicated lines or half-duplex on the dial-up telephone network. It is now available in the "minibox" package. The result: a 54% reduction in volume. The 208A/B is also available in space-saving OEM card configurations.

DC power consumption has been reduced to approximately 2W. Other performance improvements include:

- Compatibility with *all* currently available 208s.
- Full loopback capability—local and remote; analog and digital.
- Suitability for multi-drop applications.
- Improvement in signal-to-noise performance, thanks to advanced equalizer design.

If it's time to bring your datacomm system up to 4800bps, then it's time to ask for technical details on UDS 208s. Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/721-8000; Telex 752602 UDS HTV.

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Created by Dayner/Hall, Inc., Winter Park, Florida

Continued from page 73

The adapters can be ordered in 4-, 6-, 8- and 8-wire keyed polarization. The adapters can be used in IBM Token-Ring applications with the IBM 8228 Multistation Access Units, according to the vendor.

The Modular IBM Adapters cost $28.28.

Mod-Tap System, P.O. Box 706, Ayer Road, Harvard, Mass. 01451.

SYSTEMS & PERIPHERALS

Turnkey systems

Lattice Logic U.S.A. has announced its **Application Specific Engine** workstation.

The Application Specific Engine consists of a 32-bit computer that runs the vendor's Chipsmith silicon compiler software; a large 1,280- by 800-pixel monochrome monitor that displays design data through the Digital Research, Inc. Graphics Environment Management windowing system; 3M bytes of real memory; 16M bytes of virtual memory; and an 80M-byte hard disk.

The Application Specific Engine workstation is priced from $15,995 for an entry-level workstation. A complete system costs $24,995.

Lattice Logic U.S.A., Suite 199, 3333 Bowers Ave., Santa Clara, Calif. 95054.

CAD/CAM/CAE

Daisy Systems Corp. has enhanced its **Physical Modeling Extension** (PMX) with **PMX Fastboard**.

The PMX system is said to allow designers to simulate systems that use advanced components, such as Intel Corp.'s 80386 32-bit microprocessor, at speeds of up to 25 MHz.

The PMX Fastboard allows users to incorporate the actual microprocessors and other very large-scale integrated components when simulating board- and system-level designs, according to the vendor.

The Fastboard is said to support variable vector playback rates from 200 KHz up to 25 MHz in increments of 20 nsec.

It features a 64K-byte vector depth for each of 94 logic signal channels.

PMX Fastboard costs $15,000.

Daisy Systems, 700 Middlefield Road, Mountain View, Calif. 94039.

Data storage

Ciprico, Inc. has introduced the **Rimfire 2000** enhanced storage module drive disk and small computer systems interface controller and the **Tapemaster 2000** ½-in. tape controller for Multibus II systems.

The Rimfire 2000 features a 128K-byte and 512K-byte on-board sector cache, a defect management system that includes track and sector mapping and compatibility with 24-MHz disk drives and a 48-bit error correction code.

The Tapemaster 2000 reportedly features a dual-ranked first-in, first-out in the data path, allowing data transfer rates of up to 1.5M bit/sec., scatter read and gather write commands.

Rimfire 2000 costs $3,495, and Tapemaster 2000 costs $2,795, according to the vendor.

Ciprico, 2955 Xenium Lane, Plymouth, Minn. 55441.

Zetaco, Inc. has announced **Model ARZ-1**, a disk controller said to emulate Data General Corp.'s Argus/6236, and **Model LRS-10**, a DG-compatible optical disk subsystem.

Model ARZ-1 supports data transfer rates of up to 3M bit/sec. It includes a 1G-byte optical disk drive, a 100M-byte magnetic disk drive, an Argus-emulating peripheral controller and controller-to-drive cabling.

Model ARZ-1 is priced at $4,995. Model LRS-10 costs from $20,000 to $30,000.

Zetaco, 6850 Shady Oak Road, Eden Prairie, Minn. 55344.

■

Bering Industries, Inc. has announced its **Model 5840-RM Twinpac** dual Bernoulli disk drive subsystem for the Hewlett-Packard Co. CS/80 and SS/80 computers.

The Model 5840-RM Twinpac features two 8-in., 20M-byte removable Bernoulli cartridges and can be used as primary storage and as a backup system. According to the vendor, the average read/write transfer rate of the drive is 655/364K bit/sec., and the average seek time is 40 msec.

The Model 5840-RM Twinpac costs $5,890 and the Model 5820-RM Unipac costs $4,890.

Bering Industries, 1400 Fulton Place, Fremont, Calif. 94539.

Terminals

Gould, Inc. has introduced the **IP9000 Series Image Processor**.

The IP9000 series is said to process 2,048- by 2,048-pixel by 32-bit true color images with a 1,280- by 1,024-pixel, 60Hz flicker-free image display. The IP9000 arbitrated bus structure permits multiple functions to run concurrently, allowing a user to perform a Fast Fourier Transform while simultaneously acquiring, processing and displaying an image.

The IP9000 series is available in Model 9516, a one-user system, and Model 9527, a two-user system.

The IP9516 costs $74,000, and the IP9527 costs $120,000.

Gould, 46360 Fremont Blvd., Fremont, Calif. 94538.

Printers/Plotters

Western Graphtec, Inc. has introduced the **GP 9011** E-size pinch roller plotter.

The GP 9011 is a four-pen pinch roller plotter capable of handling sizes from 8½- by 11-in. to architectural engineering sizes. The unit fea-

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tures an axis-compensating function that automatically lines up the X and Y axes with the paper. A 20-char. by 2-line LCD display enables program debugging and simple interactive operation of various manual functions. The GP 9011 costs $8,950.

Western Graphtec, 12 Chrysler St., Irvine, Calif. 92718.

■

Western Graphtec, Inc. has introduced its **MP2300** eight-pen flatbed plotter.

The MP2300 has a plotting speed of 10 in./sec. in the drawing mode and 16 in./sec. when the pen is raised. Other features of the MP2300 include an automatic pen capping system, automatic pen selection, a dual-voltage switch and an electrostatic paper-hold-down system.

The MP2300 is priced at $1,250.

Western Graphtec, 12 Chrysler St., Irvine, Calif. 92718.

■

Printronix, Inc. has introduced its **L300 bar code printer**.

The L300 is said to be capable of producing all major bar codes. According to the vendor, a variety of forms may be used, including card stock, adhesive-back forms for labels and six-part forms for reports, invoices and sales orders. Features include a dark plot mode for increased ribbon life and a quick-access cover option that enables users to remove labels without opening the cover.

The L300 is priced at $5,400.

Printronix, P.O. Box 19559, 17500 Cartwright Road, Irvine, Calif. 92713.

Auxiliary equipment

Digital Controls Corp. has announced its **Model 9000** small computer system interface (SCSI) switch.

According to the vendor, Model 9000 allows reconfiguration of peripheral controllers between multiple processor systems that use the SCSI host adapter interface. It allows switching and reconfiguration for backup or job-related changes, according to the vendor.

Model 9000 is priced at $1,350.

Digital Controls, 3495 Newmark Drive, Miamisburg, Ohio 45342.

■

Perfectdata Corp. has announced **Perfect-Vu**, a line of screen filters for video display units.

The filter line features an acrylic polymethyl methacrylate said to offer light-absorbing and light-diffusing characteristics. The screens reduce glare by 96% and enhance contrast between the data displayed and the background.

Perfect-Vu is available in eight sizes. Pricing is $34.95 each.

Perfectdata, 9174 Deering Ave., Chatsworth, Calif. 91311.

■

Decitek Test Systems, Inc. has introduced the **CT-300** portable interactive tester.

The CT-300 is said to provide diagnostic capability to test and exercise most terminals and printer devices. CT-300 was designed for applications such as incoming inspection, quality assurance, field service, manufacturing final test, marketing demonstrations and in-house maintenance.

The CT-300 incorporates two serial ports, one parallel port and a data line monitor. The front panel load port accepts both erasable, programmable, read-only memory-based cartridges and battery-backed random-access memory cartridges.

The CT-300 is priced at $1,995.

Decitek Test Systems, 25 South St., Hopkinton, Mass. 01748.

PRICE REDUCTIONS

Dayna Communications has announced price reductions for its **MacCharlie and MacCharlie Plus.**

MacCharlie and MacCharlie Plus both provide a fast interface between IBM Personal Computers and Apple Computer, Inc.'s Macintosh programs and files.

Both programs include 256K bytes of random-access memory and one disk drive, according to the vendor.

Both MacCharlie and MacCharlie Plus now cost $795.

Dayna Communications, Suite 530, 50 S. Main St., Salt Lake City, Utah 84144.

■

Bering Industries, Inc. has announced price reductions on its **Series 8000-EP** enhanced performance drives for Hewlett-Packard Co.'s CS/80 and SS/80 computers.

The EP line features faster transfer rates and seek times than those of Bering's standard Series 8000 line as well as a faster disk controller.

The 8065-EP 65M-byte hard disk now costs $4,650, the 8095-EP 95M-byte disk now costs $5,450, the 80135-EP 135M-byte hard disk now costs $8,150 and the 80190-EP 190M-byte hard disk has been reduced to $9,150.

Bering Industries, 1400 Fulton Place, Fremont, Calif. 94539.

■

Hewlett-Packard Co. has reduced the price of its **Enhanced Portable Plus** portable computer and the **extended memory drawer** and **memory card**.

The Enhanced Portable Plus computer with 512K bytes of random-access memory, featuring a high-contrast LCD display, has been reduced from $3,395 to $2,995.

The extended memory drawer has been reduced from $495 to $395. The memory card, previously priced at $350, has been reduced to $250.

HP, Inquiries Manager, 1000 N.E. Circle Blvd., Corvallis, Ore. 97330.

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COMPUTER INDUSTRY

Section begins on page 102

Teknowledge retools expert systems for business market

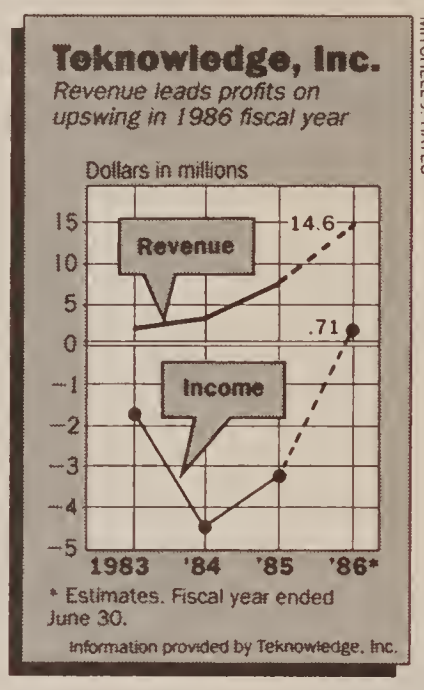
Despite profits, analysts doubt MIS acceptance

By Maura McEnaney

PALO ALTO, Calif. — By the time Teknowledge, Inc. had launched its initial public offering last March, the company had earned its stripes in the artificial intelligence software and services market.

After five years in business, the developer of expert system shells could boast an impressive client list. Heavies like General Motors Corp., Procter & Gamble Co. and FMC Corp. not only had large service contracts with Teknowledge, but each owned a 10% interest in the company.

In addition to its noteworthy client list, Teknowledge in 1984 was one of the first AI-related firms to bring a product to the market.



Despite Teknowledge's early achievements, however, analysts say the company could be in for a rude awakening as it attempts to bring its products and services out of the technical sphere and into mainstream business applications.

Although sales of its M.1 and S.1 expert system tool kits account for less than 25% of the company's revenue today, Teknowledge further distinguishes itself as being one of the few profitable AI-related firms. For the year ended June 30, Teknowledge expects to turn a small but nonetheless significant profit of $710,000, or 13 cents a share, compared with fiscal 1985 losses of $1.16 per share.

According to Dataquest, Inc. analyst Roseann Stach, who is also a former employee of Teknowledge, the biggest issue for Teknowledge and other AI firms is timing.

"The market that is evolving is not the end-user market," Stach says. "MIS managers today are getting bombarded with all types of technology and are not easily convinced of the benefit of expert systems. It would be much easier to sell them software that cleans Cobol code." Expert systems may not make it into MIS shops for another three to seven years, she adds.

Founded in 1981 by a group of 20 scientists, including current Vice-President Frederick Hayes-Roth, Teknowledge was launched as a training and services organization for companies interested in developing in-house expert systems. In 1984, Teknowledge introduced its S.1 tool kit for LISP workstations and the M.1 tool kit, written in Prolog for developing smaller knowledge-based systems on micros.

Because of the limited installations of LISP-based machines, Teknowledge late last year announced plans to rewrite its software in the C language to allow the product to run on Unix-based systems and Digital Equipment Corp.'s VAX machines running VMS.

Teknowledge Chairman, President and Chief Executive Officer Lee Hecht says that under the C language, the M.1 and S.1 packages can be used to solve more general business problems, an area the company is anxious to enter and one that offers the most revenue potential.

Advertising, marketing and field services expenses associated with that strategy change contributed to an anticipated $270,000 fourth-quarter loss, the company said last week. Teknowledge also cited a delay in some expected orders for the shortfall but expects its revenue to show 48% growth to $4.3 million in the quarter.

Although Hecht says Teknowledge's shift into the mainstream computer market and its continued emphasis on its high-margin services is necessary, others say the company is confused.

See **TEKNOWLEDGE** page 78

AT A GLANCE

TEKNOWLEDGE

Founded: 1981

Headquarters: Palo Alto, Calif.

Chairman and CEO: Lee Hecht

Primary products: Expert system shells

Estimated 1986 revenue: $14.6 million (fiscal year ended June 30)

Estimated 1986 profits: $710,000

Initial public offering: March 1986

Employees: 180

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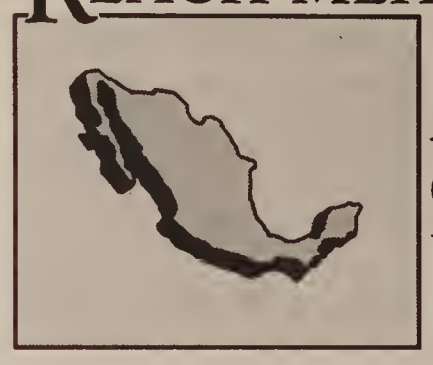

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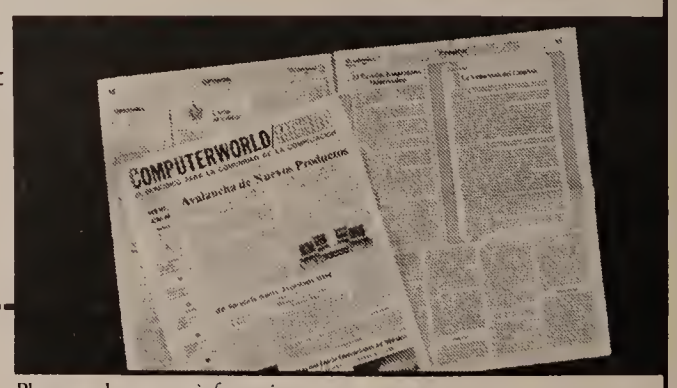

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John P. Bertsch is President of Bertsch & Company Advertising, Inc., a full service recruitment advertising agency headquartered in New York, with offices in Boston, MA and Irvine, CA. John is often asked by his clients to recruit data processing professionals and where to run their ads.

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A PUBLICATION OF CW COMMUNICATIONS

Teknowledge retools systems

From page 76

"They change their product strategy every quarter," says Harvey Newquist, analyst with DM Data, Inc. in Scottsdale, Ariz. "They started out as an education and contract company, then with S.1 shifted to become a mid-level tool company and later with M.1 tried to get into the low end," Newquist says.

Porting the products over to the C language allows Teknowledge to address a part of the market the company was losing, but it is also a portion of the market that has not yet grasped the benefits of expert systems. Teknowledge is also lagging behind AI competitors like Inference Corp. and Intellicorp, both of which have succeeded with niche products for factory automation and government applications, Newquist says.

AI companies that will survive must have products consistent with today's operating environments, provide a lot of support and have strong management and execution, according to Dataquest's Stach. She says Teknowledge has a chance, provided those problems are not overlooked.

"The thing to watch is how well the management controls their products," Stach says. "Teknowledge has to decide what business it is in — service or software. It needs to figure out which is the cart and which is the horse."

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Ungermann-Bass, Inc. reported revenue for the quarter ended June 30 of $22.7 million, compared with $18.7 million in the comparable period one year ago. The company reported a net loss for the quarter of $3.9 million, or 23 cents per share, compared with a net income of $1.3 million, or 8 cents per share, in the same quarter last year.

■

Mohawk Data Sciences Corp. reported net income for the fourth quarter of $1.5 million, or 10 cents per share, on revenue of $48.9 million. This compares with a net loss of $120 million, or $8.20 per share, on revenue of $78.7 million reported in the like quarter a year ago.

■

Wyse Technology, Inc. reported revenue for the first quarter ended June 30 of $52.6 million, an increase of 43% over the $36.9 million reported in the like quarter of the previous year. Profits were $4 million, or 34 cents per share, compared with $2.2 million, or 24 cents per share, a year ago.

■

Paradyne Corp. announced revenue for the second quarter ended June 30 of $67.1 million, compared with $66 million one year ago. Net income was $495,000, or 2 cents per share, compared with a net loss of $9.2 million, or 41 cents per share, in the like quarter a year ago.

■

Fortune Systems Corp. announced net income of $253,000, or 1 cent per share, on revenue of $9.7 million for the second quarter ended June 30. This compares with net income of $222,000, or 1 cent per share, on revenue of $14.6 million in the comparable period last year.

■

Quantum Corp. reported revenue for the first quarter ended June 29 of $25.3 million, compared with $34 million in the previous year. Profits were $2.5 million, or 25 cents per share, compared with $5.7 million, or 60 cents per share, in the like quarter a year ago.

■

Britton Lee, Inc. announced revenue for the second quarter ended June 30 of $7.4 million, compared with $8.1 million in the previous year. Net loss for the second quarter was $262,000, or 3 cents per share, compared with net income of $1.1 million, or 14 cents per share, reported in the second quarter in the prior year.

■

Integrated Software Systems Corp. reported net income of $166,000, or 3 cents per share, on revenue of $7.6 million for the second quarter ended June 30. This compares with net income of $613,000, or 11 cents per share, on revenue of $8.7 million reported for the second quarter of fiscal 1985.

■

Duquesne Systems, Inc. announced revenue for the third quarter ended June 30 of $7.4 million, a 157% increase over $2.9 million in the like period a year ago. Profits were $1.5 million, or 30 cents per share, compared with $564,000, or 13 cents per share, a 159% increase over net income reported in the comparable period a year ago.

■

Northern Telecom, Inc. reported net income of $58 million, or 50 cents per share, on revenue of $1.1 billion for the second quarter ended June 30. This compares with net income of $76.4 million, or 66 cents per share, on revenue of $1.1 billion in the previous year.

■

Compugraphic Corp. announced revenue for the second quarter ended June 30 of $83 million, compared with $105.1 million in the like period a year ago. The company reported a net loss of $1.8 million, or 22 cents per share, compared with a net profit of $8.4 million, or $1.01 per share, in the comparable period one year ago.

■

Xerox Corp. announced income from continuing operations for the second quarter ended June 30 of $135 million, or $1.27 per share, compared with $120 million, or $1.12 per share, in the comparable period last year.

Net income in the second quarter, including a discontinued operations charge of $12 million, was $122 million, or $1.13 per share, compared with $220 million, or $2.17 per share (including a $95 million gain from discontinued operations), a year ago.

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TI upswing continues in second quarter

Sales, income increase; continued growth seen

By James A. Martin

DALLAS — Texas Instruments, Inc. last week reported its third consecutive quarter of improvement in operating performance.

The company's second-quarter net income was $12.3 million, or 35 cents per share, compared with a loss of $3.9 million, or 16 cents per share, in the same quarter of 1985.

Net sales billed for the three months ended June 30 were $1.24 billion, up slightly from $1.23 billion in the previous year.

Although no specific figures were given, the company said its data systems division was profitable in both the second quarter and the first six months of the year, compared with year-earlier losses.

The semiconductor division's performance improved for the quarter, operating slightly below break-even. For the six months, however, the division sustained operating losses due to weak capital spending and a decrease in computer shipments.

Continued semiconductor losses

Although TI should experience overall sales and income growth for the remainder of the year, semiconductor losses should continue in the third quarter with some improvement in the fourth quarter, according to James L. Barlage, managing director of Smith Barney, Harris Upham & Co.

Sales in the data systems division should remain static, unless there is some improvement in the economy. "Their costs are now under control, but I don't see much happening in revenue there," Barlage said.

Data systems has been lagging behind competitors in sales of its micro and minicomputers, but its efforts to establish a foothold in the emerging artifical intelligence technology mart could provide some much-needed income growth by next year, he added.

All don't walk to IBM's beat

From page 102

All of those companies recently reported second-quarter earnings gains ranging from solid to spectacular. These are hardly niche companies but broad-based, established firms that are selling plenty of computer hardware and software. Not to mention the computer services market, which appears as strong as ever.

Is this really an industry slump?

Granted, the high-end, general-purpose mainframe systems business is down. Companies with most of their eggs in that basket — like Amdahl Corp. — exemplify this downward trend, while vendors diversifying away from that market — like NCR — are seeing rewards.

Slower U.S. capital spending is a reality, and no computer industry segment feels that pinch more than large systems that require a multi-million dollar investment decision.

But what of all the spending for DEC minis, MSA applications, Compaq clones and Tandem transaction processors? Although information systems spending will fall below earlier projections for the year, there are clearly plenty of MIS dollars out there for vendors with the right products and the right approach.

One year ago, the slump was an across-the-board reality. Now, many vendors have recovered not by waiting for the economy to improve but by making the right technological and business decisions. For others, the industry slump is an excuse on which to blame a host of product and/or marketing disappointments.

Stuck in the mud

While IBM's woes in some cases typify the difficulties of certain industry segments, it does not make sense to simply look at IBM's falling profits and conclude that the entire industry is still stuck in the mud. Due partially to its mind-boggling size, IBM has many unique problems — such as the mid-range confusion born of IBM's different architectures for different markets.

While Wall Street might still believe the maxim that when IBM sneezes (actually, wheezes may be more accurate), the industry catches a cold, a clearer look at the industry halfway through 1986 proves otherwise. IBM and many other vendors are ailing, but plenty more are healthy, and some even look ready to run a triathlon. Armonk is not the only place to read an industry weathervane.

■

It's not nice to fool Wall Street. Daisy Systems Corp. learned this earlier in the year when it admitted that its predicted rosy scenario would not materialize. The latest victim of such an "oops" was Floating Point Systems, Inc.

Floating Point recently announced that revenue for the quarter ended July 31 will fall below year-earlier levels, while profits will reach 50% of last year's, at best. The firm's stock promptly lost almost half its value in a New York Stock Exchange sell-off, and last week, two separate class-action lawsuits on behalf of shareholders were filed against the company.

Stay tuned.

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The tee shirts were used as entries to first calls, hand delivered by Pansophic salespeople. And a great number of shirts were delivered. *"We got responses from the high-level people that we weren't able to reach before, and these people were interested in more than just tee shirts,"* recalls Jack Luebeck, Director of Marketing for Pansophic. *"They were also interested in learning how GENER/OL can save them money, so the tee shirt requests yielded many viable sales leads. And those leads are already turning into sales,"* Jack reports.

And responses are *still* coming in. *"Responses have come from companies of every size. In fact, just name a company, and we probably heard from them,"* says Jack.

"We're now running only in Computerworld and we're expanding our program," Jack explains. Prior to this campaign, when Jack would ask his sales people for prospective publications in which to advertise, three or four publications were generally listed.

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Action lifts CDC division

From page 102

ing a commodities market, he says. Competition from Japanese and U.S. West Coast vendors intensified dramatically, saturating the market with peripherals, which led to large price reductions.

But external reasons cannot explain the magnitude of CDC's problems. The peripherals division was in the classic market leadership position, primarily built on its dominant position in the removable drive portion of the industry, Perlman says.

As that technology shifted quickly to fixed drives, the division could not move quickly enough to catch up.

"There is more than enough guilt to go around," Perlman admits.

The firm banked on thin-film head technology to become prominent, but instead, orders declined. Its volume production facilities were designed for ferrite or composite heads, causing too much inventory and capacity.

The return to profitability resulted from Perlman's decision to concentrate on the high-performance, high-capacity drive OEM market, which he says was the firm's biggest strength.

He slashed the work force from approximately 19,000 to 10,000 people. He eliminated eight of 15 products. The factories reorganized into just-in-time manufacturing lines, adopted statistical methods of control and increased automation.

CDC also sold off a number of the group's businesses, such as its magnetic media unit to Xidex Corp. and its IBM plug-compatible Series/1 minicomputer peripherals business to Cambex Corp.

The Data Storage Products Group was decentralized in June to include four autonomous units — components, large-disk, small-disk and optical/tape. The optical storage business is a joint venture with N. V. Philips.

"I don't want to tell you that morale was wonderful through all this," Perlman says. "But I think people now feel that they have been a part of the turnaround, and for people that have been through that, it's pretty heady stuff."

"You have to give Perlman much of the credit for the turnaround," Blauer says. "He is what that business needed — a strong, action-oriented guy who gets things fixed."

Perlman is clear about his plans for the group's future. "We have to continue the improvement in gross margins," he says. "I believe that we have to take from 20% to 25% out of our product cost each year for the next two years to remain competitive."

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Lawmaker delays effort

From page 102

need for the legislation because the industry was able to self-regulate," ADAPSO attorney Joe Ruble said.

In April, ADAPSO produced a set of warranty guidelines that the group hopes its members will adopt. Among the firms to adopt the guidelines is Lotus Development Corp.

Industry representatives say they understand the campaign for stronger warranties has not ended with this legislative session.

"Assemblywoman Molina voluntarily withdrew the bill from consideration, but she remains the judge and jury," ADAPSO's Ruble said. "The warranty issue is a continuing campaign on our part."

Others in the industry say they prefer legislative action on warranties because software is not classified in the Uniform Commercial Code covering warranties.

"I believe legislative clarification of our situation might be constructive," noted Marty Rinehart, chairman of the Software Publisher Association's warranty commission.

According to Rinehart, chairman of Wallsoft Systems, a software company in New York City, Molina's bill was faulty in that it did not take different kinds of software into account. For example, companies producing game software have a completely different set of responsibilities than data base software firms, he said.

Legislation similar to the Molina bill was also drafted but never filed in New York state this year.

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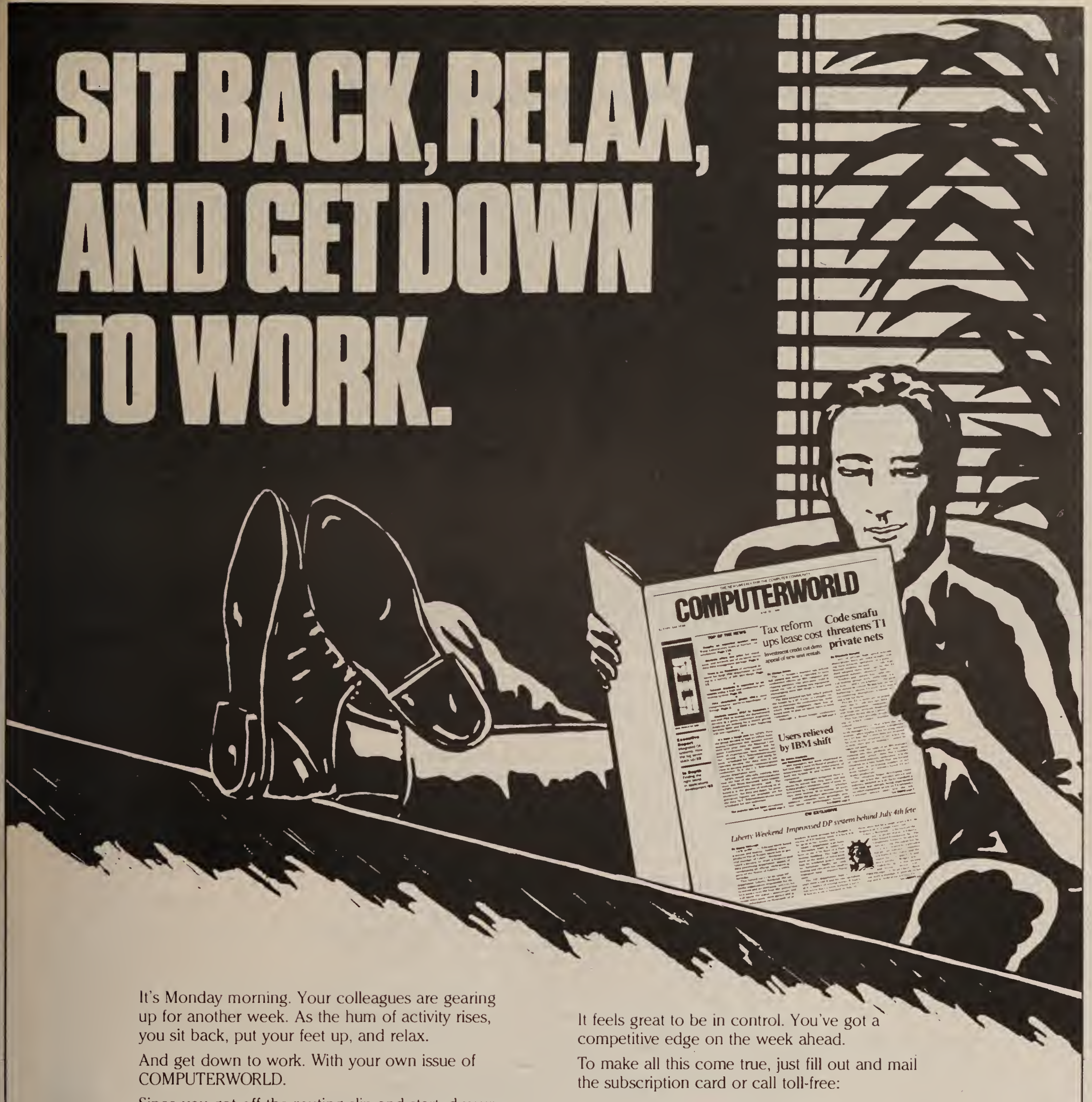

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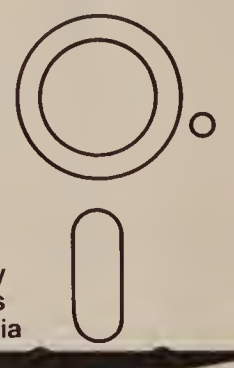

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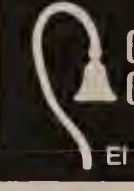

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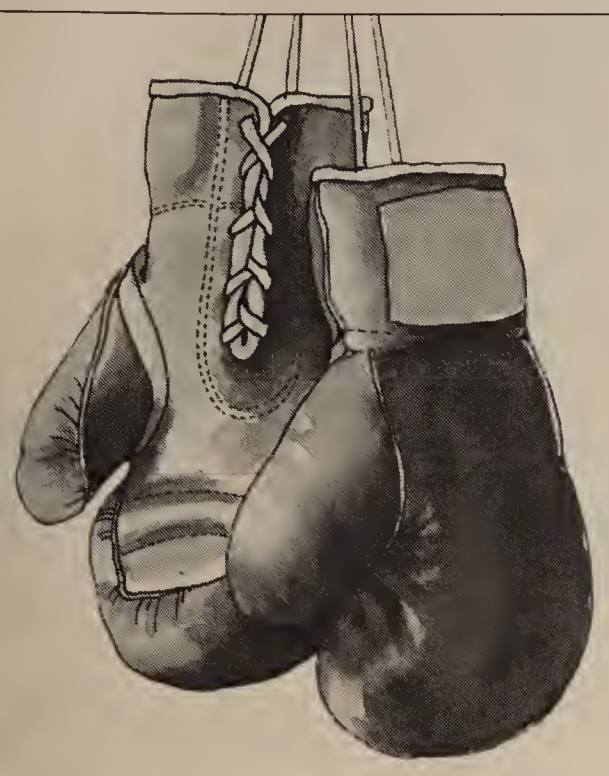

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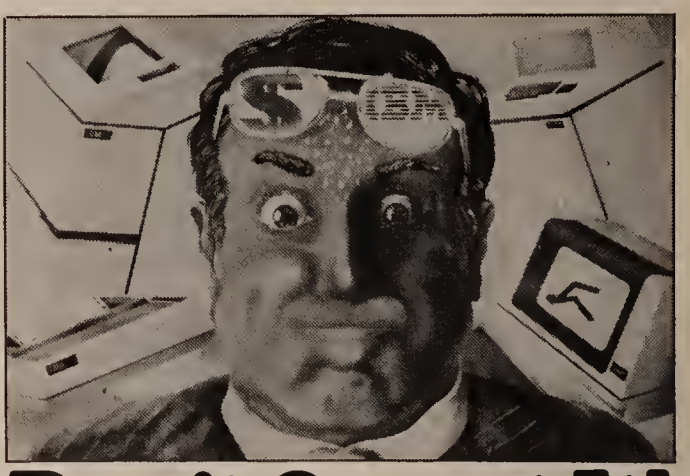

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Send 2 copies of resume to the MIT Personnel Office, 77 Mossochusetts Avenue, E19-239, Cambridge, MA 02139. Refer to position #R86-047.

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Send resume to reach Assistant Director for Civilian Personnel, (CPOH), DPA, 9th ASG (PROV) (USAGH), ATTENTION: NAF, APO San Francisco 96343-0082, no later than 25 August 1986.

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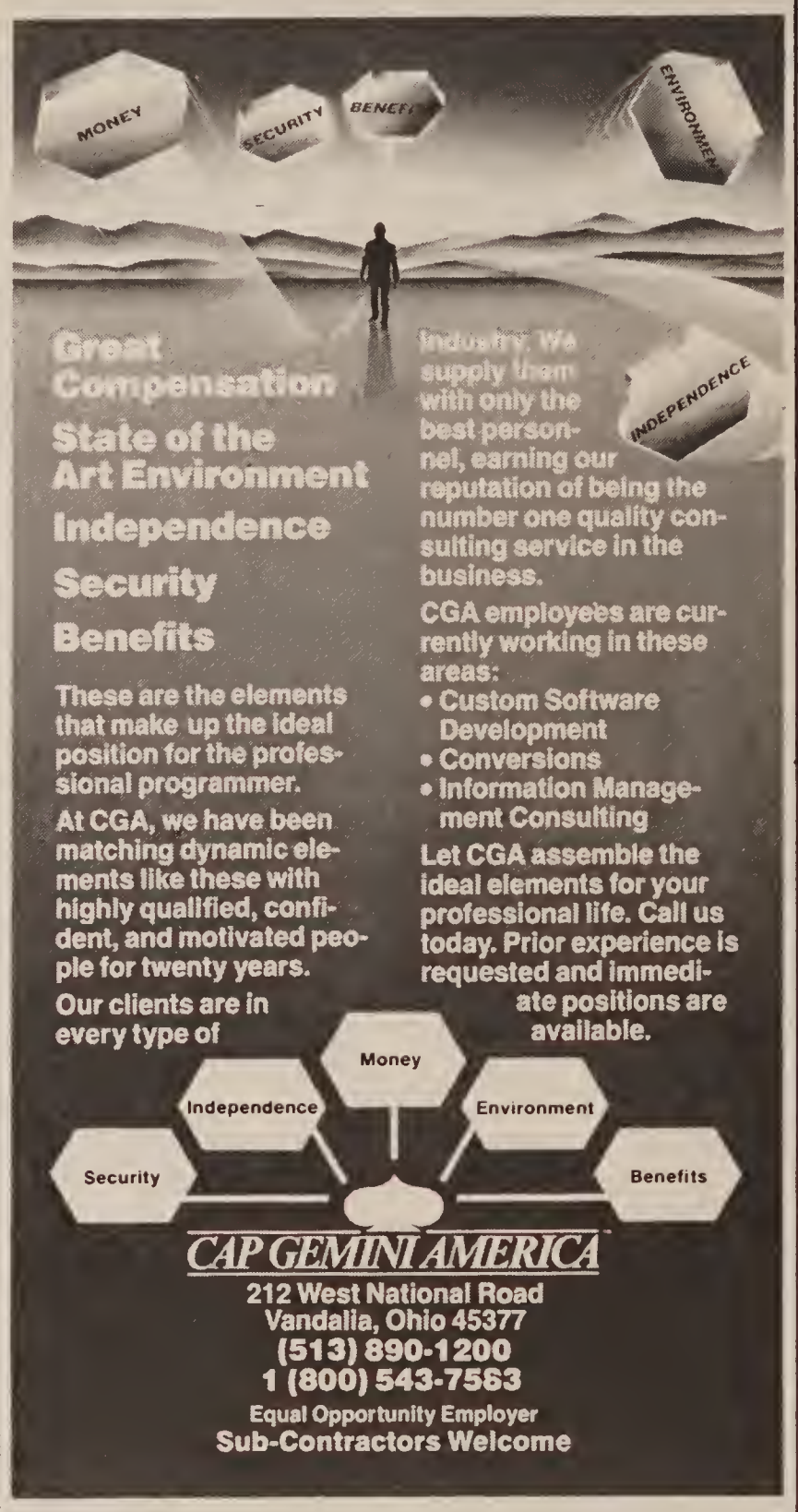

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U.S., Japan resolve year-long semiconductor trade dispute

Japan agrees to promote sales of U.S.-made chips

By Edward Warner
Computerworld International News Service

WASHINGTON, D.C. — The U.S. and Japanese governments last week announced the settlement of their year-long semiconductor trade dispute. The settlement requires the Japanese government to monitor the costs and prices of Japanese-made semiconductors and take several steps toward promoting the sale of U.S.-made semiconductors in Japan.

The settlement suspends the U.S. government's plan to impose punitive import duties in two cases of alleged Japanese chip-dumping. Although one case involved 64K-byte erasable programmable read-only memory chips and the other arose over 256K-byte dynamic random-access memory chips, both named most of the same Japanese vendors, including Fujitsu Ltd., Toshiba Ltd. and NEC Corp.

The settlement stopped short of guaranteeing U.S. semiconductor vendors a specific share of the Japanese market, but the U.S. chip industry's trade group said it will reactivate its unfair trade charges unless significant market share gains are made in the next five years.

> ***The SIA said it will reactivate its unfair trade charges unless significant market share gains occur in the next five years.***

Alan Wolff, an attorney representing the Semiconductor Industry Association (SIA), said the U.S. industry expects to capture slightly more than 20% of the Japanese market by 1991, or it will renew its trade complaints at the International Trade Commission. He said this should result in about $5 billion in increased U.S. sales in Japan, where U.S. vendors' current market share is slightly more than 8%.

The SIA nonetheless praised the agreement as the first step toward a new era of cooperation in U.S.-Japan trade relations. "It must be considered a point of departure rather than a destination, but it places us on the right path to achieve a fair, balanced and truly competitive trading environment," said George Scalise, senior vice-president of Advanced Micro Devices, Inc. and public policy chairman of the SIA.

Scalise acknowledged that the agreement will raise chip prices for U.S. consumers in the short term, but he said the current prices are unrealistic, predatory and weaken the industry to the long-term detriment of consumers. He said the U.S. semiconductor industry has a history of reducing prices by about 30% per year.

U.S. Trade Representative Clayton Yeutter called the pact "one of the most significant agreements that has ever been negotiated by the United States of America." He said the pact was reached "at the 11th hour and 59th minute."

In return for suspension of the chip-dumping cases, U.S. negotiators won the Japanese government's agreement to monitor the costs and prices of Japanese semiconductors exported to the U.S. The monitoring will be done by Japan's Ministry of International Trade and Industry (MITI), which will require Japanese chip vendors to submit cost and export price data to the agency.

Should the monitoring program uncover a Japanese vendor engaged in chip dumping, the Japanese government promised to take legal action against the offender.

The two nations plan to draw up a list of chips to be monitored that will include standard Japanese chips that pose a threat of being sold at less than fair market value in the U.S. or are destined for "third countries," according to a U.S. Department of Commerce statement. The statement did not define "third countries," but sources say those nations include most of Western Europe. If the Commerce Department comes to believe that any monitored chip is being dumped in the U.S., it can demand the data the alleged offender supplied to MITI under the program.

To increase U.S. vendors' access to the Japanese chip market, the settlement also calls on the Japanese government to encourage Japanese semiconductor customers to buy non-Japanese chips. It also urges promoting long-term relationships and joint product development between U.S. chip vendors and Japanese customers, providing U.S. vendors with equal access to Japanese patents resulting from government-sponsored research.

The agreement also calls upon the Japanese government to establish an organization to encourage Japanese chip customers to buy from non-Japanese vendors. The organization will, at the request of potential customers, assess the quality of non-Japanese semiconductors.

CW Correspondent Mitch Betts contributed to this story.

"Computerworld's audience delivers the proven professionals that we look for."

Marc Blessing
Director
CompuSearch
Cleveland, Ohio

A division of Management Recruiters International with 172 offices in the U.S., CompuSearch markets itself as the nation's largest recruitment agency devoted exclusively to MIS/DP placement. But it was not always that way, according to Marc Blessing, Director of CompuSearch.

CompuSearch needed to gain industry awareness. *"Three years ago the general public and most of the DP industry had never heard of CompuSearch. Prospective clients would often say, 'who?' when our account executives would call,"* says Marc. *"We needed national recognition and we needed a publication that would allow us to zero in on our target audience."*

So CompuSearch started advertising in Computerworld. And it worked.

"It worked because of Computerworld's audience," he explains. *"We're getting people with diverse backgrounds — from dedicated professionals with 2-3 years of programming experience to top MIS/DP management."*

"Computerworld's audience delivers the proven professionals that we look for," Marc reports.

"Because of the new contacts that Computerworld produced on both the client and candidate sides, we decided to increase — actually double — our advertising in 1986," he adds. *"We've considered other publications, but we know that our dollars stretch farther with Computerworld. It allows us to hit our target audience,"* concludes Marc.

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Marc.

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A PUBLICATION OF CW COMMUNICATIONS

DEC finishes record year

From page 102

pany's performance resulted from a revamped VAX line with dozens of new offerings, compatible computer architectures, lowered manufacturing costs and an aggressive effort to crack traditional IBM mainframe installations in markets such as banking and insurance.

"Their products are in place for the commercial market, and it's just a matter of spending time with those accounts, which they are doing now," said Jay Stevens, an analyst with Dean Witter Reynolds, Inc.

DEC has hired some 6,000 sales and service employees in the past year, while overall employment increased by about 5,000 to 94,700 worldwide, according to DEC spokesman Mark Steinkrauss. The differential was due to attrition in manufacturing and administrative jobs.

Steinkrauss said the Microvax II has been a key product in DEC's strategy in the commercial market. "When the customer understands how effective that is in departmental computing, it's a real door-opener for us," he said.

Tomorrow, DEC is expected to announce products to fill in its high end and to continue to target the commercial and financial marketplace.

"All of our surveys indicate that they are improving their position in the banking market," said Rich Mikita of market research firm International Data Corp.

"The new machines will help that by filling in the gap between the VAX 8600 and 8800. And their research efforts to improve the transaction processing capabilities of the VAX and Vaxcluster will be of particular interest in banking," Mikita said.

Salomon Brothers analyst Marc Schulman noted that of all DEC CPUs, the VAX 8600 and 8650 furthest exceeded their sales expectations during the year. "Those are the systems most targeted at the large commercial accounts," he said.

Many of DEC's sales have come at the expense of minicomputer rivals IBM, Hewlett-Packard Co. and DG. "HP is in a major transition, IBM is trying to rationalize its mid-range and DG is still trying to get into the commercial arena," Dean Witter's Stevens said. "DEC's three leading competitors are in transition, and that might not occur again in this century."

DEC increased its fourth-quarter net profit margin to 11% from 5.4% one year earlier. Steinkrauss attributed the margin to increased manufacturing efficiency, inventories that are $800 million lower than year-ago levels, a greater percentage of higher margin new products in DEC's product mix and consolidation of facilities.

DEC's gross margin of 47.1% during the quarter was at its highest level in at least 13 years, Schulman said.

In addition to the financial services industry, Steinkrauss said DEC made strong gains during the year selling to the Bell operating companies and to customers using the VAX 8800 for simulation and modeling in fields such as aerospace.

Compaq up; AST down in micros

From page 102

do the job of sales and support on the $1,000 to $10,000 deals better than any manufacturer's sales force."

The earnings and revenue drop of Irvine, Calif.-based AST Research, which had been expected [CW, July 14], did reflect the market pressures of low-priced clones.

In a prepared statement, AST President Safi Qureshey cited "market acceptance of PCs other than IBM" and "recent functionality changes IBM has made in its PC" as reasons for the fourth-quarter decline.

The latter citation refers to recent IBM pricing changes that offer higher margins to retailers selling IBM micros fully configured by IBM, rather than enhanced with memory boards and other features from independent vendors such as AST Research.

AST earned $4.1 million, or 35 cents per share, down from $6.7 million, or 61 cents per share, a year earlier. Revenue fell 6% to $40 million. During the quarter, AST laid off 65 employees, or 7% of its work force.

For the fiscal year ended June 30, AST's profits were $27.2 million, or $2.34 per share, up 43% from 1985 levels. Revenue grew 24% to $172 million.

INDUSTRY NOTES

IBM to decentralize in Europe

IBM confirmed that it will decentralize its operations in Europe in an effort to improve telecommunications sales and increase local autonomy. IBM Europe will be divided into two groups, one including West Germany, France and Italy and the other made up of smaller markets.

■

Control Data Corp. announced it has repaid all of its short-term bank debt in the U.S., paying off the final $315 million with proceeds from the recent sale of $350 million in long-term corporate bonds. CDC's 27 creditor banks had given the company a deadline of Dec. 31, 1986, to repay the short-term debt.

■

Cullinet Software, Inc. said it may report the first losses in its history for the quarters ended July 31 and Oct. 31. Chief Executive Officer David Chapman said sales and earnings for most of fiscal 1987, ending next April 30, will be below expectations. He cited the cost of recent moves to spur sales, including a 30% increase in Cullinet's worldwide sales force and the firm's entry into the Digital Equipment Corp. VAX market.

Caution is the watchword for semiconductor investments

ACTIVE ISSUES
Kathy Porteus

Amid the wreckage of semiconductor stocks, some of which recently fell to three-year lows, there are few salvageable investment ideas. Some analysts suggest avoiding the entire group, whereas others recommend major companies like Intel Corp. (INTC — 19), Motorola, Inc. (MOT — 35¾) and Texas Instruments, Inc. (TXN — 109⅞) for long-term investments. But what about the smaller specialty semiconductor companies?

Both large and small capitalization semiconductor companies have been hurt by overall industry trends, including a declining book-to-bill ratio, computer industry doldrums and flat or declining order rates. But "because smaller niche or specialty companies depend largely on one product or one market segment," says John Geraghty, vice-president with First Boston Corp., their business may swing more positively or negatively than the overall industry trend.

As an example, Geraghty cites Monolithic Memories, Inc. (MMIC — 12½), a maker of bipolar large-scale integrated semiconductor memory and logic circuits. Geraghty, who recommends purchase of Monolithic, says the company's programmable array logic circuits are selling well. Owing to licensees, the company is also less exposed to foreign competition, Geraghty says.

Throughout this prolonged recession, Monolithic has shown weakness but has not reported a loss. Geraghty estimates Monolithic will earn 50 cents per share in fiscal 1986, ending Sept. 30, and 95 cents in fiscal 1987.

"The leverage of these smaller companies is so tremendous that it is difficult to forecast earnings," acknowledges Paul Johnson, analyst with L. F. Rothschild, Unterberg Towbin, who estimates Monolithic will earn $1 per share in fiscal 1987. Considering current market conditions, Monolithic has "done a great job," Johnson says.

Another smaller chip company Geraghty likes is Standard Microsystems Corp. (SMSC — 13⅛), which produces standard and custom metal oxide semiconductor integrated circuits. "The company is investing a fair amount in research and development and has good new products," Geraghty says.

Eli Sayegh, analyst with S. G. Warburg & Co., advises investors to avoid everything at this stage. Although the bulk of damage has already occurred, Sayegh says, "you're not going to see any near-term performances, so at best, you'd be sitting on dead money."

Sayegh concurs with other analysts in saying that Monolithic will continue out-performing the industry. But in addition to moving in sympathy with other semiconductor issues, its stock price has dropped, Sayegh says, because investors have begun anticipating weakness in the firm's programmable array logic business, which will cause lower earnings expectations.

Sayegh calls both Monolithic and LSI Logic Corp. (LLSI — 9⅜) examples of "profitless prosperity." According to Sayegh, LSI's sales continue to grow nicely, but margins remain under pressure and are essentially break-even.

Rothschild's Johnson remains neutral on LSI because of its limited near-term earnings visibility. However, he praises the company for its broad semicustom product portfolio, strong management team, global diversification strategy and solid cash position.

James Barlage, vice-president of Smith Barney, Harris Upham & Co., avoids second-tier semiconductor companies because the stocks are "still pretty fully priced even given the correction we've seen."

Barlage also considers the niche strategies of companies such as Integrated Device Technology (IDTI — 7¾) and VLSI Technology, Inc. (VLSI — 9 1/4) a disadvantage because "such strategies provide virtually no flexibility in the event technology changes or competition intensifies."

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Sun revenue rises in fourth quarter

By Rosemary Hamilton

MOUNTAIN VIEW, Calif. — While many large system vendors recently reported sluggish earnings, workstation vendor Sun Microsystems, Inc. last week reported a whopping 82% increase in revenue for its 1986 fiscal year and a 106% revenue increase for the fourth quarter ended June 30.

Sun reported year-end revenue of $210.1 million, up from $115.2 million in its 1985 fiscal year. Net income for the year was $11.9 million, or 46 cents per share, up from $8.5 million, or 36 cents per share.

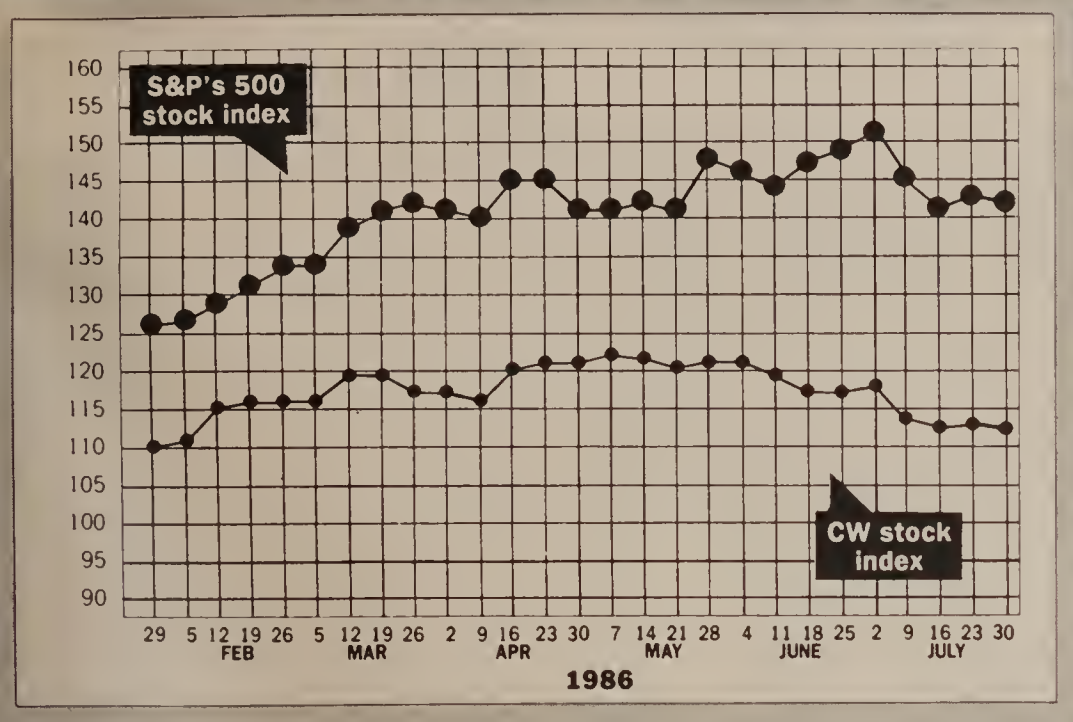
For the fourth quarter, Sun reported revenue of $76.7 million. Its quarterly net income of $5.9 million was a 181% improvement from a year ago. Per-share earnings increased to 21 cents per share, from 8 cents per share in 1985's fourth quarter.

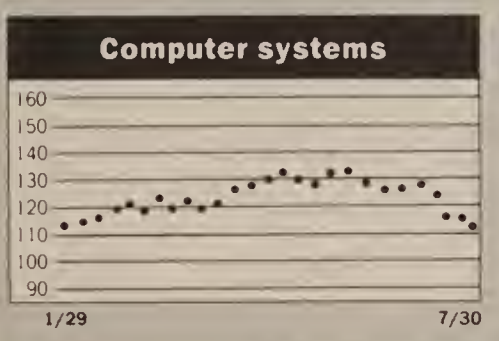
Sun last week also announced a three-year, $60 million OEM agreement with UK mainframe vendor International Computers Ltd., which will base all of its future workstation products on the Sun-3 line.

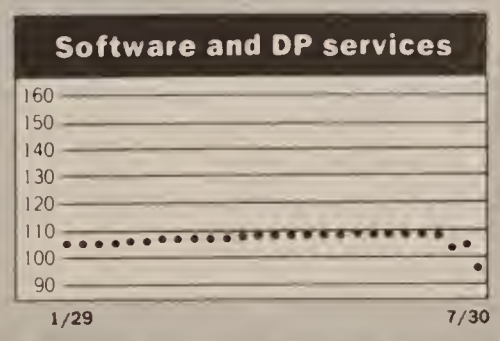
COMPUTER INDUSTRY

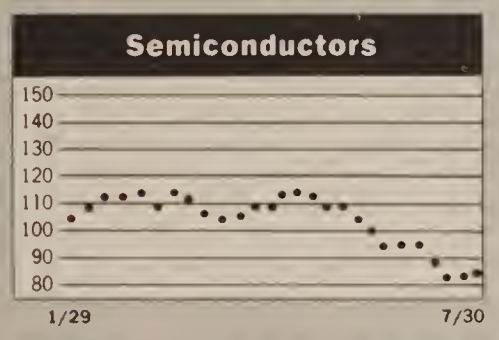
MITCHELL J. HAYES

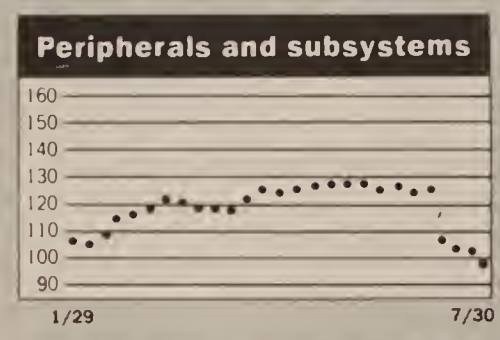
Computerworld stock trading index

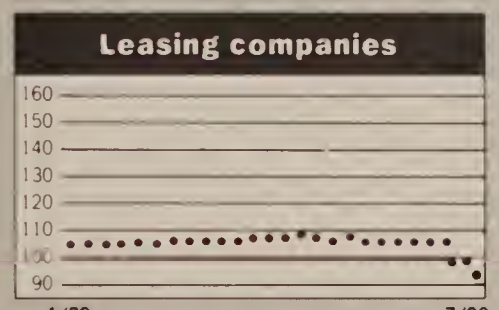


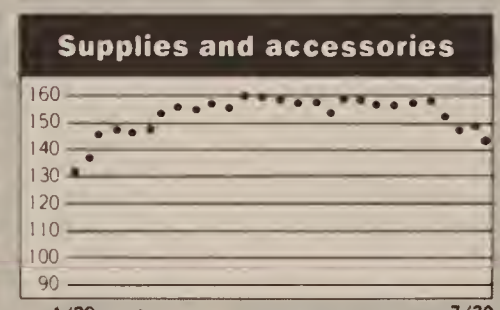












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	7/23/86	7/30/86
Computer systems	114.0	**111.6**
Software and DP services	101.7	**97.3**
Peripherals and subsystems	101.1	**99.3**
Supplies and accessories	147.1	**143.3**
Semiconductors	80.5	**81.6**
Leasing companies	97.7	**93.0**
CW stock index	112.7	**112.2**
Standard and Poor's 500 stock index	142.7	**141.5**

Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, JULY 30, 1986

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE JULY 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS					
O	ALPHA MICROSYSTEMS	8	5	5.00	-0.5	-9.1
O	ALTOS COMPUTER SYS	19	10	12.88	-0.8	-5.5
A	AMDAHL CORP	19	10	16.63	-0.6	-3.6
O	APOLLO CDMPUTER INC	21	9	10.38	-0.5	-4.6
O	APPLE COMPUTER INC	39	14	30.50	-3.6	-10.6
N	AT&T	26	20	23.88	+0.1	+0.5
N	BURROUGHS CORP	72	52	66.88	+2.1	+3.3
O	C P T CORP	7	4	4.13	-0.1	-2.9
N	COMPAQ COMPUTER CORP	18	8	13.38	+0.6	+4.9
A	COMPUTER CONSOLES INC	12	6	8.00	+0.1	+1.6
O	CONCURRENT COMP CORP	25	1	12.38	-0.9	-6.6
N	CONTROL DATA CORP DEL	28	15	20.75	-1.4	-6.2
O	CONVERGENT TECH	14	6	6.13	-0.6	-9.3
N	CRAY RESH INC	100	44	86.88	-2.8	-3.1
D	DAISY SYS CORP	32	8	9.13	+0.8	+9.0
N	DATA GEN CORP	50	31	33.13	+0.1	+0.4
N	DATAPOINT CORP	13	5	7.00	-0.4	-5.1
N	DIGITAL EQUIP CORP	94	50	92.00	+5.0	+5.7
N	ELECTRONIC ASSOC INC	7	4	3.88	-0.4	-8.8
N	FLOATING POINT SYS INC	46	16	16.63	-1.9	-10.1
N	GOULD INC	38	15	16.75	-0.1	-0.7
N	HARRIS CORP DEL	36	22	28.50	-5.0	-14.9
N	HEWLETT PACKARD CO	48	29	39.25	+0.5	+1.3
N	HONEYWELL INC	87	59	62.50	-3.4	-5.1
N	IBM	162	122	132.25	-0.9	-0.7
O	IPL SYS INC	4	1	3.00	0.0	0.0
N	ITT CORP	60	32	54.00	-0.3	-0.5
N	M A COM INC	21	13	14.75	+0.5	+3.5
N	MATSUSHITA ELEC INDL LTD	100	49	81.63	+3.0	+3.8
O	MENTOR GRAPHICS CORP	21	12	13.00	-0.5	-3.7
N	MODULAR COMPUTER SYS	9	6	8.88	0.0	0.0
N	MOHAWK DATA SCI CORP	4	1	2.25	0.0	0.0
N	NBI INC	18	9	9.75	-1.1	-10.3
N	NCR CORP	57	31	49.75	-0.5	-1.0
N	PRIME CDMPUTER INC	28	15	19.38	+0.8	+4.0
N	SPERRY CORP	76	46	75.25	-0.1	-0.2
O	STRATUS COMPUTER	26	15	18.25	-1.0	-5.2
O	SYMBOLICS INC	16	7	7.50	-0.1	-1.6
O	TANDEM COMPUTERS INC	35	13	33.38	-0.4	-1.1
N	TANDY CORP	45	31	36.50	+2.0	+5.8
N	TEXAS INSTRS INC	148	88	109.00	+4.4	+4.2
A	ULTIMATE CORP	35	11	15.50	-7.0	-31.1
A	WANG LABS INC — B	23	12	14.38	+0.9	+6.5
A	WANG LABS INC — C	23	11	14.75	+1.6	+12.4
N	XEROX CORP	72	46	53.38	+0.8	+1.4
	SUPPLIES & ACCESSORIES					
N	AMER BUSINESS PRODS	37	25	30.75	-1.6	-5.0
N	BARRY WRIGHT CORP	25	17	18.25	-0.1	-0.7
A	DUPLEX PRODS INC	23	17	19.75	-0.5	-2.5
N	ENNIS BUSINESS FORMS INC	28	15	23.00	-0.8	-3.2
N	3M CO	115	74	111.25	+1.0	+0.9
N	MOORE LTD	28	18	25.50	+0.4	+1.5
O	STANDARD REGISTER CO	50	30	36.75	-0.5	-1.3
N	WALLACE COMPUTER SVCS	50	33	45.88	-0.1	-0.3

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE JULY 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & DP SERVICES					
O	ADVANCED COMP TECH	7	3	5.25	+0.4	+7.7
N	ADVANCED SYS INC	20	11	16.13	-1.3	-7.2
N	AGS COMPUTERS INC	25	14	17.50	-0.4	-2.1
O	AMERICAN MGMT SYS INC	20	7	16.75	0.0	0.0
O	AMERICAN SOFTWARE INC	15	9	11.50	-0.9	-7.1
N	ANACOMP INC	7	3	5.00	-0.4	-7.0
O	ANALYSTS INTL CORP	10	5	4.75	-0.5	-9.5
O	ASHTON TATE	34	10	21.88	-1.9	-7.9
O	ASK COMPUTER SYS INC	15	7	10.75	+1.1	+11.7
O	ASTRADYNE COMP IND	3	1	1.31	0.0	0.0
N	AUTOMATIC DATA PROC	39	18	31.25	-2.1	-6.4
O	COMPUTER ASSOC INTL INC	25	10	22.50	+1.8	+8.4
O	COMPUTER HORIZONS CORP	15	10	10.38	-0.6	-5.7
O	COMPUTER NETWORK TECH	10	2	5.06	-1.5	-22.9
N	COMPUTER SCIENCES CORP	40	20	33.13	-0.9	-2.6
O	COMPUTER TASK GROUP INC	19	12	12.50	-0.3	-2.0
O	COMPUTONE SYS INC	7	2	1.88	-0.8	-28.6
O	COMSHARE INC	13	9	11.88	-0.1	-1.0
N	CULLINET SOFTWARE INC	27	8	8.13	-2.8	-25.3
O	CYCARE SYS INC	17	10	12.00	-0.1	-1.0
O	DUQUESNE SYS INC	45	11	29.50	+0.5	+1.7
N	GENERAL ELEC CO	83	56	73.88	-1.1	-1.5
N	GENERAL MTRS CORP	50	33	43.38	-0.3	-0.6
N	GTE CORP	57	38	54.13	-0.9	-1.6
O	HDGAN SYS INC	12	4	10.00	-0.5	-4.8
O	INFORMATION SCIENCES INC	4	1	3.00	0.0	0.0
O	INFOTRON SYS CORP	23	12	12.50	+0.5	+4.2
O	KEANE INC	18	7	7.00	-1.8	-20.0
N	LOGICON INC	43	27	27.00	-0.5	-1.8
O	LOTUS DEV CORP	39	15	31.50	-1.4	-4.2
O	MANAGEMENT SCI AMER	16	8	13.38	-0.9	-6.1
O	MCI COMM CORP	13	8	9.00	-0.6	-6.5
O	MICOM SYS INC	23	11	11.00	-0.3	-2.2
O	MICRO PRO INTL CORP	4	2	2.31	-0.1	-2.6
O	MICROSOFT CORP	36	26	28.75	-1.3	-4.2
O	NATIONAL DATA CORP	26	11	18.38	-0.5	-2.6
O	ON LINE SOFTWARE INT	16	6	12.00	-0.5	-4.0
O	ORACLE SYS CORP	29	16	16.00	-1.8	-9.9
N	PANSOPHIC SYS INC	36	18	26.25	-0.5	-1.9
N	PLANNING RESH CORP	24	14	18.38	-0.8	-3.9
O	POLICY MGMT SYS CORP	24	15	16.75	+0.5	+3.1
O	PROGRAMMING & SYS INC	11	5	9.13	+0.1	+1.4
O	REYNOLDS & REYNOLDS CO	35	18	32.75	+1.3	+4.0
O	SCIENTIFIC COMPUTERS INC	6	4	4.38	-0.1	-1.4
O	SEI CORP	28	15	15.75	-0.3	-1.6
O	SHARED MED SYS CORP	41	29	33.75	+1.1	+3.4
O	SOFTWARE AG SYSTEMS INC	22	13	17.25	-0.1	-0.7
O	SOFTWARE PUBG CORP	11	5	6.00	-0.5	-7.7
A	STERLING SOFTWARE INC	21	7	17.00	-0.8	-4.2
N	UCCEL CORP	23	13	19.88	-0.4	-1.9
N	URS CORP	18	10	16.13	0.0	0.0
O	VM SOFTWARE INC	32	17	24.25	-2.8	-10.2
	SEMICONDUCTORS					
N	ADVANCED MICRO DEV	34	14	16.25	+1.6	+11.1
N	ANALOG DEVICES INC	25	14	17.50	+0.8	+4.5
O	ANALOGIC CDRP	16	10	10.88	+0.3	+2.4
N	APPLIED MAGNETICS CORP	20	12	14.50	+0.3	+1.8
O	AVANTEK INC	24	17	16.50	-0.8	-4.3
O	HADCO CORP	7	4	4.63	+0.1	+2.8
O	INTEL CORP	32	17	19.25	+1.3	+6.9
O	MICRO MASK INC	8	3	3.75	-0.5	-11.8
N	MOTOROLA INC	50	29	37.75	+2.0	+5.6
N	NATIONAL SEMICONDUCTOR	16	9	9.63	+0.4	+4.1
N	TERADYNE INC	30	17	19.00	-0.5	-2.6

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE JULY 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	PERIPHERALS & SUBSYSTEMS					
A	AM INTL INC	9	3	6.38	-0.3	-3.8
A	ANDERSON JACOBSON INC	3	2	2.13	-0.1	-5.6
O	AST RESH INC	33	11	11.00	-0.8	-6.4
O	AUTOTROL CORP	10	6	7.25	0.0	0.0
O	AVANT GRADE CDMPUTING	10	3	3.75	-0.1	-3.2
O	BANCTEC INC	13	7	7.25	-1.1	-13.4
N	BOLT BERANEK & NEWMAN	48	27	37.63	-1.8	-4.4
O	CAMBEX CORP	2	1	1.00	0.0	0.0
N	CENTRONICS DATA COMP	8	4	7.00	+0.3	+3.7
A	CETEC CORP	9	6	6.50	-0.4	-5.5
A	COGNITRONICS CDRP	6	4	3.81	-0.1	-1.6
N	COMPUGRAPHIC CORP	29	19	19.25	+0.1	+0.7
N	COMPUTERVISIDN CORP	19	9	12.00	+0.5	+4.3
N	CONRAC CORP	18	11	15.00	-0.3	-1.6
A	DATAPRODUCTS CORP	18	11	13.63	-0.4	-2.7
A	DATARAM CORP	18	5	8.00	+0.3	+3.2
O	DATA SWITCH CORP	9	4	5.63	-0.8	-11.8
O	DATUM INC	7	5	5.75	0.0	0.0
N	DECISION INDS CORP	15	9	9.00	-0.5	-5.3
D	ENDATA INC	8	3	5.63	+0.3	+4.7
O	EVANS & SUTHERLAND	27	15	22.13	+2.0	+9.9
N	FLOATING POINT SYS INC	46	16	16.63	-1.9	-10.1
O	GANDALF TECHNOLOGIES	8	5	6.25	0.0	0.0
N	GENERAL DATACOMM IND	15	8	10.25	-0.3	-2.4
N	HAZELTINE CORP	30	16	17.63	+0.1	+0.7
O	ICDT CORP	13	6	9.75	+0.1	+1.3
O	INFORMATION INTL INC	18	10	15.75	-0.5	-3.1
O	INTECOM INC	7	3	5.00	+0.3	+6.7
O	INTERLEAF INC	15	8	8.63	-1.4	-13.8
O	MEGADATA CORP	5	3	3.38	-0.1	-1.8
A	MSI DATA CORP	14	8	11.00	-0.4	-3.3
N	NASHUA CORP	28	12	26.75	+2.5	+10.3
O	NETWORK SYS CORP	27	10	12.00	+0.1	+1.1
N	NORTH AMERN PHILIPS CORP	48	32	37.00	-2.5	-6.3
N	NORTHERN TELECOM LTD	39	25	28.25	+0.5	+1.8
O	NOVELL INC	21	10	17.75	-0.3	-1.4
O	OMEX	1	0	0.38	-0.3	-40.0
N	PARADYNE CORP	13	6	6.75	-0.4	-5.3
A	PENRIL CORP	10	5	5.50	0.0	0.0
N	PLESSEY PLC	38	19	29.63	-2.4	-7.4
O	PRINTRONIX INC	15	10	12.88	+1.0	+8.4
O	QMS INC	16	6	13.00	-0.8	-5.5
O	RAMTEK CORP	7	2	5.25	+0.1	+2.4
N	RECOGNITION EQUIP INC	17	9	10.50	-1.5	-12.5
N	SANDERS ASSOC INC	63	29	59.75	0.0	0.0
O	SCAN TRON CORP	24	12	16.50	-1.3	-7.0
N	SCIENTIFIC ATLANTA INC	15	9	9.13	+0.1	+1.4
O	SEAGATE TECHNOLDGY	14	5	11.25	-0.5	-4.3
N	STORAGE TECHNOLOGY	7	1	2.75	-0.3	-8.3
O	SUN MICROSYSTEM INC	20	12	15.25	0.0	0.0
A	T-BAR INC	7	5	5.88	+0.1	+2.2
A	TAB PRDDS CO	15	10	14.25	+0.5	+3.6
O	TANDON CORP	8	3	4.50	-0.3	-5.3
A	TEC INC	11	4	4.75	+0.3	+5.6
N	TEKTRDNIX INC	65	47	56.25	+0.1	+0.2
O	TELEVIDEO SYS INC	4	2	2.88	-0.3	-8.0
N	TELEX CORP	69	40	55.38	-1.1	-2.0
N	TIMEPLEX INC	24	14	15.75	+0.4	+2.4
N	TITAN CORP	12	5	8.38	+0.3	+3.1
O	VISUAL TECHNOLOGY INC	2	0	0.63	+0.1	+11.2
O	WYSE TECH	19	7	13.38	-0.6	-4.5
	LEASING COMPANIES					
N	COMDISCO INC	25	11	18.00	-1.3	-6.5
N	CONTINENTAL INFO SYS	12	5	10.13	+0.4	+3.8
O	FINALCO GROUP INC	5	3	3.25	0.0	0.0
O	PHOENIX AMERN INC	6	2	3.75	0.0	0.0
O	SELECTERM INC	12	5	5.00	-1.3	-20.8
N	U.S. LEASING	46	32	37.75	-1.3	-3.2

EXCH: N=NEW YDRK; A=AMERICAN; P=PACIFIC; B=BDSTON;
L=NATIDNAL; M=MIDWEST; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

COMPUTER INDUSTRY

INSIDE

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Cost cuts fuel recovery at Texas Instruments, but its computer sales remain slow/**80**

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IBM will decentralize its European operations in an effort to spur sales/**100**

INSTANT ANALYSIS

"The Japanese understand now . . . that they simply can't go on exporting more than they are importing."

— U.S. Commerce Secretary Malcolm Baldridge on the U.S.-Japan semiconductor trade agreement

DEC finishes record year

Soaring profits, sales reveal commercial MIS success

By Clinton Wilder

MAYNARD, Mass. — In results that reflect growing market share gains in the commercial MIS market, Digital Equipment Corp. last week reported 38% earnings growth on a 14% rise in revenue for the fiscal year ended June 28.

DEC ended its year as the industry's success story with a particularly strong fourth quarter in which profits soared by 138% to $238.6 million, or $1.81 per share. Fourth-quarter sales jumped by 17% to $2.17 billion.

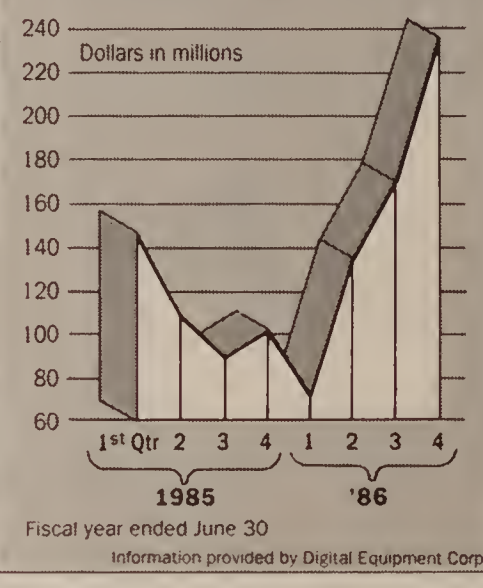
Against a backdrop of disappointing results from rivals like IBM and Data General Corp., DEC posted fiscal 1986 profits of $617.4 million, or $4.81 per share, on revenue of $7.59 billion. In fiscal 1985, DEC earned $446.7 million, or $3.71 per share, on sales of $6.68 billion.

According to DEC and its observers, the com-

See **DEC** page 100

DEC earnings

Fiscal 1986 proves to be a booming year for Digital Equipment Corp.



Fiscal year ended June 30

Information provided by Digital Equipment Corp.

MITCHELL J. HAYES

Swift action lifts CDC peripherals

By Donna Raimondi

MINNEAPOLIS — Lawrence Perlman faced a daunting task when he took over as president of Control Data Corp.'s Data Storage Products Group in early 1985. The peripherals division, long a corporate cash cow, had taken a sudden and dangerous nosedive and was taking all of CDC with it.

CDC's Perlman

"I did not have an extended opportunity to sit back and analyze the business and then decide what to do," Perlman says. "The decisions started at 8 a.m. the first morning I took over."

Analysts now credit Perlman's swift and drastic measures with saving what was once the most profitable part of CDC. The peripherals division recently posted a slight second-quarter profit for the first time since Perlman took over, and CDC as a whole is now expected to return to the black by the end of this year.

To accomplish the dramatic turnaround, Perlman first acknowledged that the peripherals market was softening, which was leading to order cancellations. He quickly put the brakes on runaway production of inventory that was destined to sit in warehouses.

Those actions and others that Perlman instituted helped stem the tide of the huge losses CDC experienced last year, says Gary Blauer, computer and technology analyst at Dain, Bosworth, Inc. in Minneapolis. "The slight profit this year, probably only a few million dollars, is a milestone," he says. "What remains to be seen is if the company will make continued progress."

Perlman cites a number of reasons for the slide in CDC's storage business. The low-end portions of the fixed disk and flexible disk markets were rapidly becom-

See **ACTION** page 82

INDUSTRY INSIGHT
Clinton Wilder

All don't walk to IBM's beat

Is IBM truly the industry's financial bellwether?

The conventional Wall Street wisdom certainly says yes, with the typical "Sell-off in technology stocks led by IBM" headlines indicating sheep-like behavior among big-block stock traders. Analysts pointed out that on IBM's black Monday three weeks ago, major selling of both Digital Equipment Corp. and NCR Corp. shares caused those stocks to drop even more, percentage-wise, than Big Blue's.

While a few jitters about DEC's stock price volatility during the current DEC boom are understandable, it seems hard to defend a 2.9% drop in NCR stock on the day it announced an 18% second-quarter earnings increase.

The computer industry bears obviously believe that IBM's current fiscal struggles are bad news for all the players in the field. Their logic is simple. Since the industry leader is in a slump, that indicates bad times for the entire industry. Conversely, if one starts from the assumption that the industry is sluggish, what better evidence is there than Big Blue's lackluster performance?

But there is indeed an answer to this rhetorical question — several answers, in fact — such as Burroughs Corp., DEC, NCR, Microsoft Corp., Computer Associates, Inc., Apple Computer, Inc., Management Science America, Inc., Tandem Computers, Inc., Stratus Computer, Inc., Compaq Computer Corp. and even Storage Technology Corp.

See **ALL** page 80

Wilder is Computerworld's *senior editor, computer industry.*

Compaq beats odds; micro downturn grips AST Research

By Clinton Wilder

Compaq Computer Corp. continued to outrun the sluggish and crowded microcomputer industry in financial results announced last week, but the slump caught up to add-on board maker AST Research, Inc., which reported a 39% earnings decline.

Houston-based Compaq, leveraging its success at the high end of the IBM Personal Computer-compatible market, said profits rose 70% from year-earlier results for the second quarter ended June 30. Compaq earned $9.6 million, or 31 cents per share, on revenue that climbed 24% to $147.1 million.

Compaq President and Chief Executive Officer Rod Canion said sales of the IBM Personal Computer AT-compatible Deskpro 286 have so far been insulated from the price pressures of Asian-made clones.

"Our latest market research showed that price is eighth on the list of factors that business users consider in purchasing that class of machine," Canion told *Computerworld*. "They're going for performance, the name of the supplier and reliability."

Canion also noted that Compaq remains committed to the dealer channel, despite the turmoil and bankruptcies in the retail microcomputer market during the past year. "The majority that have gone away were not our authorized dealers anyway," he said. "The dealer channel can still

See **COMPAQ** page 100

Calif. lawmaker postpones effort to legislate computer warranties

By Maura McEnaney

SACRAMENTO, Calif. — A state Assembly bill seeking explicit warranties on computer hardware and software products died in committee recently, after the bill's sponsor agreed to let vendors voluntarily adopt industry-suggested warranty guidelines.

Los Angeles Assemblywoman Gloria Molina last month did not request an Assembly vote on Assembly Bill (AB) 1507, which required computer vendors to guarantee, among other things, that products perform as advertised.

Molina's decision to let the bill die followed efforts by ADAPSO to let its members adopt self-imposed warranties that offer stronger consumer protection.

A spokeswoman in Molina's office said the assemblywoman will refile the bill next year if vendors fail to increase warranty protection. "She's going to wait and see what ADAPSO does," spokeswoman Jane Windes said.

Although software companies generally will take back and fix faulty versions of their software, many companies employ "as-is" warranties that require users to accept the product as it comes.

AB 1507 was opposed by many industry representatives who argued the bill would increase the cost of computer products and, in some cases, hinder growth of small entrepreneurial companies.

"Our position was there was no

See **LAWMAKER** page 82

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